



axmedis Automating Production of Cross Media Content for Multi-channel Distribution
www.axmedis.org IST-2-511299

AXMEDIS 2007

AXMEDIS Overview and Content Distribution

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<http://www.axmedis.org/>
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Table of Content

- **Preface**
- **What is AXMEDIS**
- **Short Market Analysis and Opportunities**
- **State of the Art, Limitations, Needs**
- **AXMEDIS Content Packaging**
- **AXMEDIS Content Protection and Tracking**
- **AXMEDIS Content Production and Processing**
- **AXMEDIS Application Scenarios**
- **Conclusions and references**

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This AXMEDIS tutorial and the others for the 2006

- **This tutorials is belongs to a series:**
 - ◆ **Content Production:** manual production of content, AXMEDIS model, MPEG-21 Model, object authoring, the packages, the metadata editor, the license editor, the protection editor, the players (PC, PDA, Mobile, STB/PVR), etc., Any kind of digital format content into the AXMEDIS format.
 - ◆ **Content Processing,** automated content production and processing tools, automating the backoffice, AXMEDIS GRID tools, estimation of descriptors, estimation of fingerprint, content protection, crawling of legacy databases and content management systems, content formatting, usage of Scripts, etc.
 - ◆ **Workflow tool usage with AXMEDIS tools,** integration of workflow systems with AXMEDIS, control of AXMEDIS tools, monitoring, etc.
 - ◆ **Content Distribution,** multichannel content distribution, example of for interned distribution with TISCALI, example of mobile distribution with ILABS, example of Kiosk distribution towards PDAs with ILABS, example of satellite distribution with EUTELSAT, content sharing, etc.
- **In some occasions they are proposed in compressed and/or aggregated forms**



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Purpose of this Tutorial

- **This tutorial aims to provide you an overview of the AXMEDIS technologies, solutions and architecture.**
- **It gives you answers to the following questions**
 - ◆ What is AXMEDIS ?
 - ◆ Which is the State of the Art of the sector ?
 - ◆ Which are the innovations/advantages of AXMEDIS ?
 - ◆ What can I do with AXMEDIS ?
 - ◆ Why I should use AXMEDIS ?
 - ◆ Which are the major tools of AXMEDIS ?
 - ◆ How can I use AXMEDIS for my business ?
 - ◆ Which implications I have in using AXMEDIS ?
 - ◆ Who can help me in knowing more ?
 - ◆ Any other wish ?
 - ◆ ...
- **Please do not hesitate to make questions !!**



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Schema of the Tutorial and Purpose

- **Duration: 3.5-4 hours**
- **Which could be the Attendees of this Tutorial:**
 - ◆ **who** is interested to get a general overview of AXMEDIS aims, technologies, solutions and tools
 - ◆ **Business Managers and decision makers** interested in understanding if AXMEDIS is suitable for their business or not, if it is an advantage or not, etc.
 - ◆ **Technical Managers** interested to have a first overview
 - How to exploit AXMEDIS technology in their solutions
 - technical innovation of AXMEDIS with respect to the state of the art
 - ◆ **Research Managers** interested to get an overview of the whole architecture and assessing the advantages for Using AXMEDIS framework for:
 - testing and developing new solutions, new algorithms, etc., reducing costs of infrastructure creation
 - Promoting and disseminating their new solutions on a large audience
 - Making business with AXMEDIS, exploiting the framework

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What is AXMEDIS ?

- **AXMEDIS is a consortium/project of the European Commission proposed by companies and institutions to solve a set of problems in the area of e-commerce of digital content**
 - ◆ approved by the EC for reaching specific objectives, among them the creation of an Open Platform for the digital content production, protection and distribution.
 - ◆ partially funded by the EC and partially from the Companies and Institutions involved

- **Start: 1st September 2004**
- **Cost: about 14 Meuro, >8 Meuro of Funding**
- **About 200 people are working on AXMEDIS every day**
- **More than 35 partners (contractors and affiliated)**




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Partners






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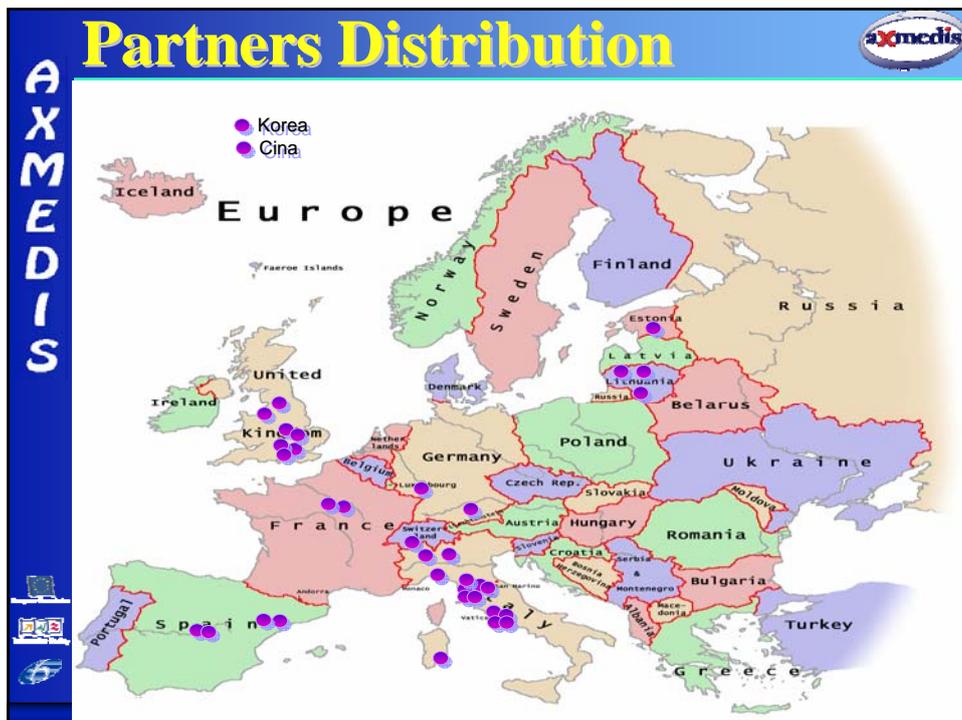
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Partners

Partners:

- UNIVERSITAT POLITÈCNICA DE CATALUNYA
- GIUNTI labs
- AFI
- SIAE
- Fraunhofer IGD
- University of Reading
- BORDAS
- Nathan
- UNIVERSITY OF LEEDS
- LABLITA
- VRS GRUPÉ
- FUNDACION ALBENIZ
- KAUNO TECHNOLOGIJS UNIVERSITETAS
- EPFL
- ETRI
- xim
- STRATEGICA
- hp
- EXITECH
- mbi
- GRUPO GESFOR
- tiscali
- TELECOM ITALIA
- [rigel][engineering]
- Hexaglôbe
- maat
- PentX S.r.l.
- elion
- teo

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Growing and numbers



- **AXMEDIS started in Sept 2004 with fewer partners**
 - ◆ GIUNTI, TISCALI, EUTELSAT, HP, AFI, SEJER, etc.
 - ◆ Univ. Florence, Univ. Leeds, FHG, Univ. Politecnica Catalogna, Univ. Reading, etc.
- **Added 10 more partners in the December 2006:**
 - ◆ BBC, TEO, ELION, TI, SDAE
 - ◆ MBI, VRS, KTU, ETRI, PKU
- **Added Affiliated partners:**
 - ◆ SIAE, PENTEX, GESFOR, MAAT-G, FIA, RIGEL, HEXAGLOBE, Focuseek
- **Now**
 - ◆ >700 AXMEDIS technical documents/tools have been downloaded
 - ◆ >1.2 Millions of accesses



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Objectives



- **reduction of costs for content production, management and distribution considering activities of B2B and B2C**
- **exploiting new models, methods and tools for content production, protection and distribution**
 - ◆ Content more
 - interactive:cross media, multimedia
 - interoperable:device, DRM, formats
- **Supporting massive processing for content production and distribution (on demand)**
- **Harmonize B2B and B2C**
 - ◆ Enforcing flexibility in business and transaction models
 - ◆ Integration of B2B and B2C areas
 - ◆ Modeling secure/legal P2P content sharing for both B2B and B2C
- **Create the AXMEDIS Framework for all**



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Applications and Customers

- **Applicative areas of AXMEDIS automation**
 - ◆ Entertainment, edutainment, infotainment, educational, etc.
 - Real-time and non-real-time content production, distribution and sharing
 - Internet, P2P, broadcast, IPTV, mobiles, DVB-T, DVB-S, DVB-H, etc.
 - ◆ And also:
 - banking, governmental, military and healthcare

- **AXMEDIS Customers**
 - ◆ content management, production, protection and distribution
 - Broadcasters, satellite, terrestrial, etc.
 - Telecom operators, multichannel operators
 - Content producers, editors, publishers
 - Collecting societies
 - Multimedia and cross media archives and WEB Portals
 - Etc.

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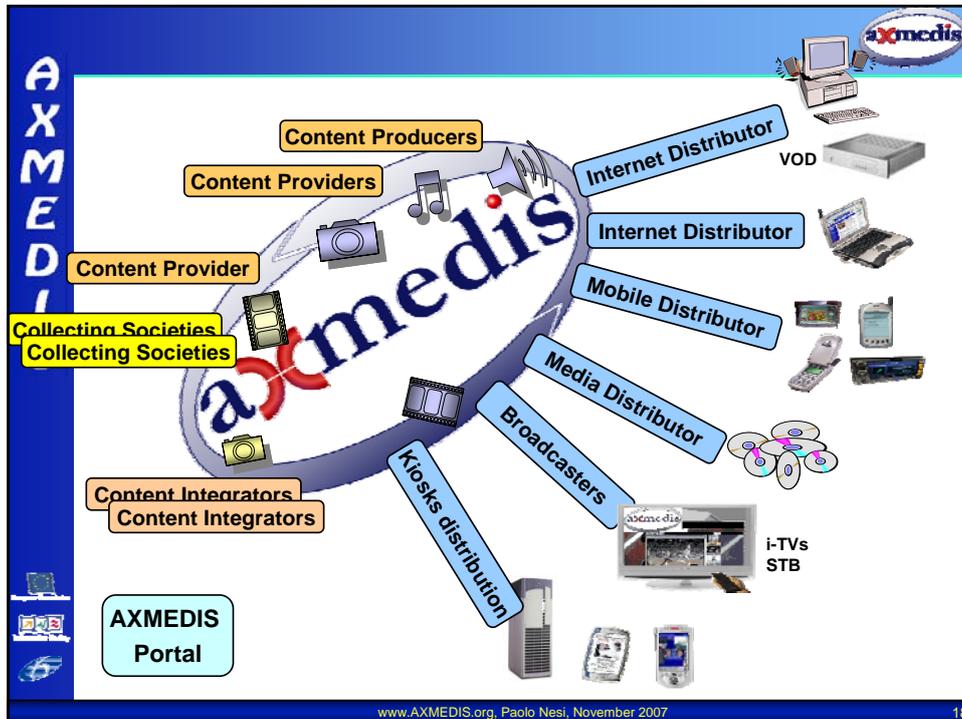
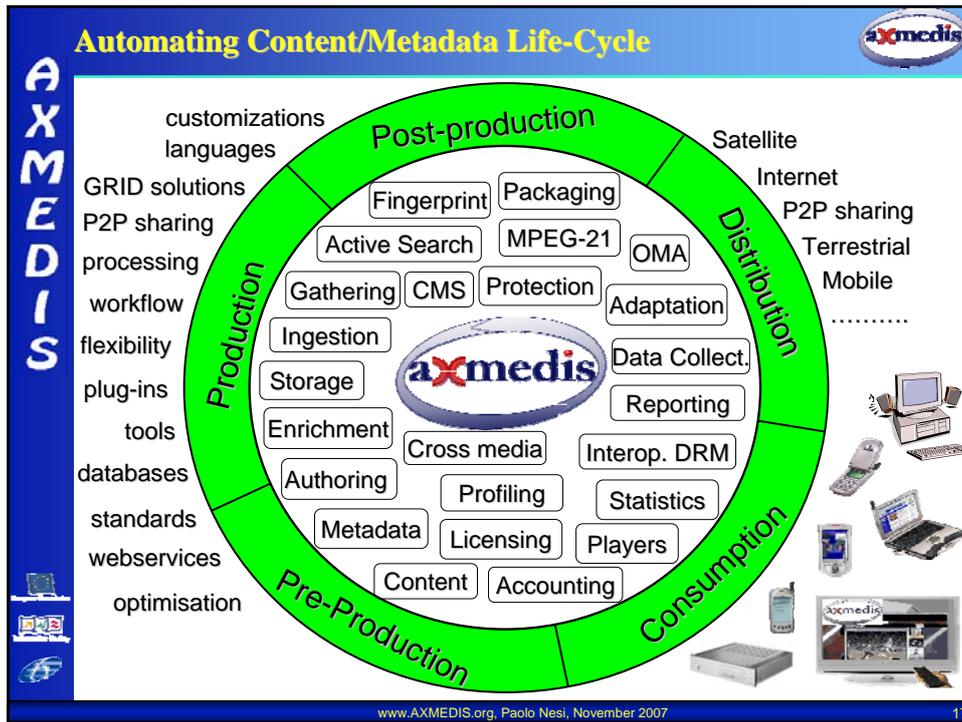


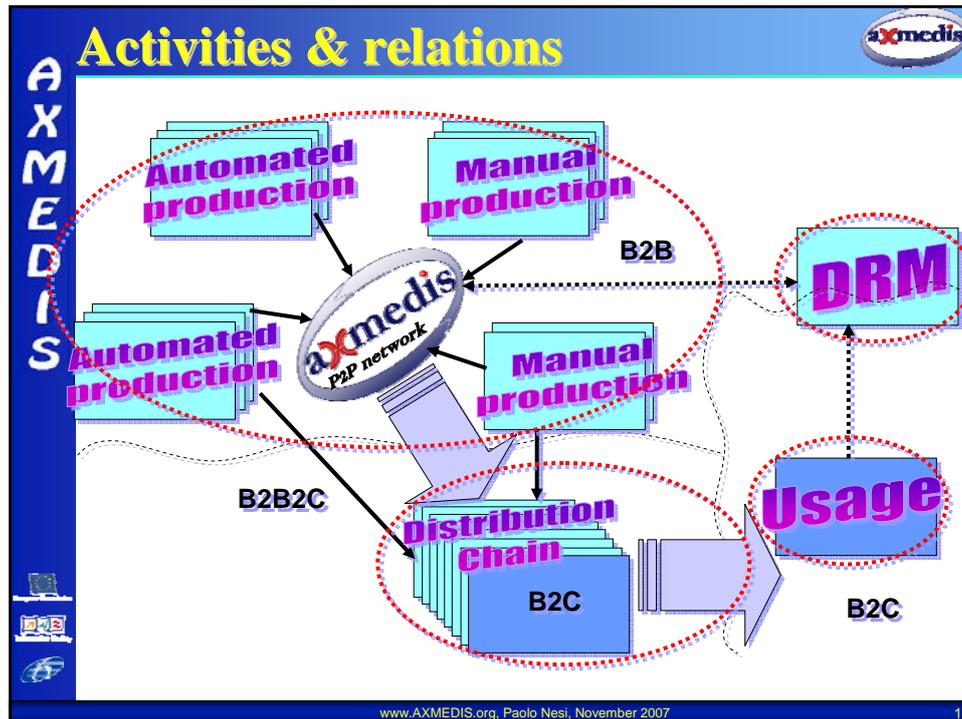
Technical Applications

- **General content management and processing**
- **Multi-channel production and distribution: broadcasting, IP/Internet, WEB sites, P2P, mobile, PDA, IPTV, interactive TV and channels, etc.**
- **Multi-channel experience for customers**
- **Video on Demand (VOD), and production on demand solutions**
- **Control of P2P content sharing and distribution, involving your customers in distribution (super-distribution)**
- **Involve customers and final users in content production and social networking**
- **interoperable DRM (MPEG-21, OMA, etc.)**
- **different business models and/or transactions on the same distribution channels: pay per play, monthly rate, preview, renting, advertising, etc.**

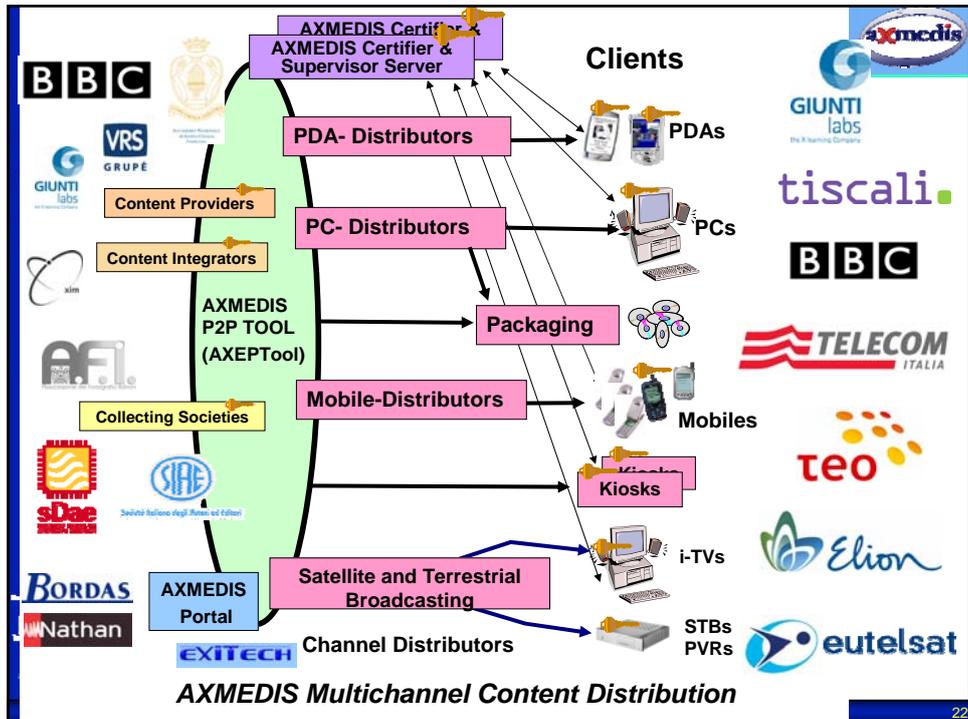
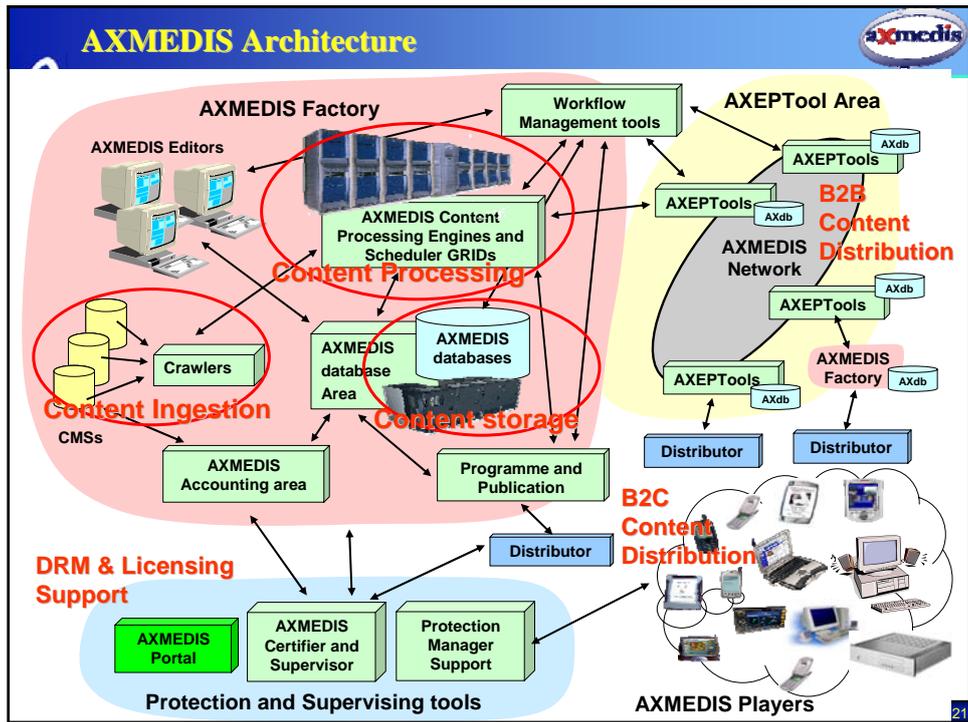
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- ## Technical Objectives
- **Enhance the interactivity and content forms**
 - ◆ cross media and simple resources
 - **Enabling interoperability among different**
 - ◆ distribution channels (TV, PDA, mobile, kiosks, broadcasting,...)
 - ◆ DRMs (digital rights management) models (e.g., MPEG-21, OMA, Windows DRM, etc.),
 - make possible translations among license formats
 - **Harmonize B2B and B2C**
 - ◆ Enforce flexibility in business and transaction models
 - ◆ Insertion of DRM into B2B, integration of B2B and B2C
 - ◆ Facilitate the passage from Contract to Digital Licenses and viceversa
 - ◆ Insertion of DRM domain management for Business and final users
 - **Enabling the production and processing**
 - ◆ at low costs and in a scalable manner with GRID technology
 - **Enabling secure/legal P2P content sharing for both**
 - ◆ B2B and B2C
 - **Reuse and improve standards, remaining open and expansible**
 - ◆ Adoption and extension of MPEG-21 and OMA
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AXMEDIS Framework

- **A unified European platform for content production and distribution, AXFW**
 - ◆ Improve standards
 - ◆ Development of the AXFW
 - ◆ Make the AXFW open, expansible and accessible to all
 - ◆ Open the Affiliation Programm to access at the AXFW
 - ◆ Set up of trials and demonstrators

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AXMEDIS Technical Architecture

User Interaction and/or Automated Control via WSs

AXMEDIS (CP) Content Processing

Script Editor and Debug

AXCP GRID Scheduler

AXMEDIS Authoring Tools

Metadata Resources

X& Multimedia Styles

DRM Licenses Plug-ins

Protection information

AXMEDIS manual and autom. content sharing and Distribution Tools

AXEPTool B2B P2P

AXMEDIA B2C P2P

Programme and Pub

AXMEDIS Administrative Tools

AXMEDIS DRM Reporting Tools

AXMEDIS MPEG-21 Multidev. Player & Plug-ins

Plug in Manager

DRM Support

Protection Support

Content Adaptation

Query Support

Workflow Support

Content Descriptors

Content Crawling

Packaging Support

Content Processing

Content Formatting

Database Support

Communic Support

Metadata Support

AXMEDIS Model Supports and Plug-ins including support for XML, XSLT, WSDL, OS, etc.

WS, https, FTP, Webdav, etc.

CMSs

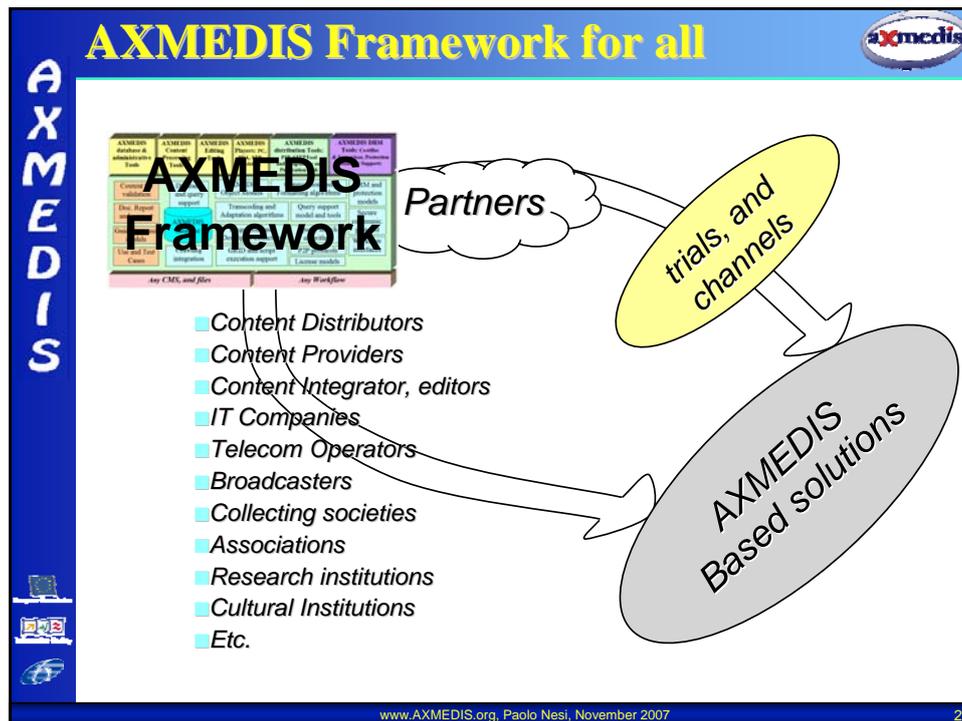
AXMEDIS, MPEG-21 Databases

AXMEDIS DRM Servers

Traditional and P2P Distribution Channels and servers

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- ## How to
- **Accessing to the AXMEDIS Framework**
 - **Exploiting AXMEDIS tools**
 - ◆ Installing and using AXMEDIS tools to set up a new business and solution
 - ◆ Customizing AXMEDIS tools and solution for your purpose
 - ➔ Integrating them in your solution
 - **Integrating AXMEDIS tools in your devices and STB**
 - **Integrating AXMEDIS P2P in your distribution model**
 - **Integrating AXMEDIS cross media model to provide more interactivity on your content and tools**
 - **Etc.**
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Affiliation to the AXMEDIS

- **You can become affiliated with AXMEDIS.** The affiliation provides access to
 - ◆ a large amount of information and knowledge
 - ◆ full source code of the AXMEDIS Framework
- The benefits of the affiliation include the possibility of using the AXMEDIS technology and tools (customize them from source code), for your business without limitations
- The affiliation can be formalized via the affiliation agreement, you can find information on the flyers and on the DVD and on the portal.
- The affiliation has a convenient annual fee that can be covered in money or value by offering in change contributions to the AXMEDIS Framework itself for the community.
- For additional information please contact Paolo Nesi nesi@dsi.unifi.it

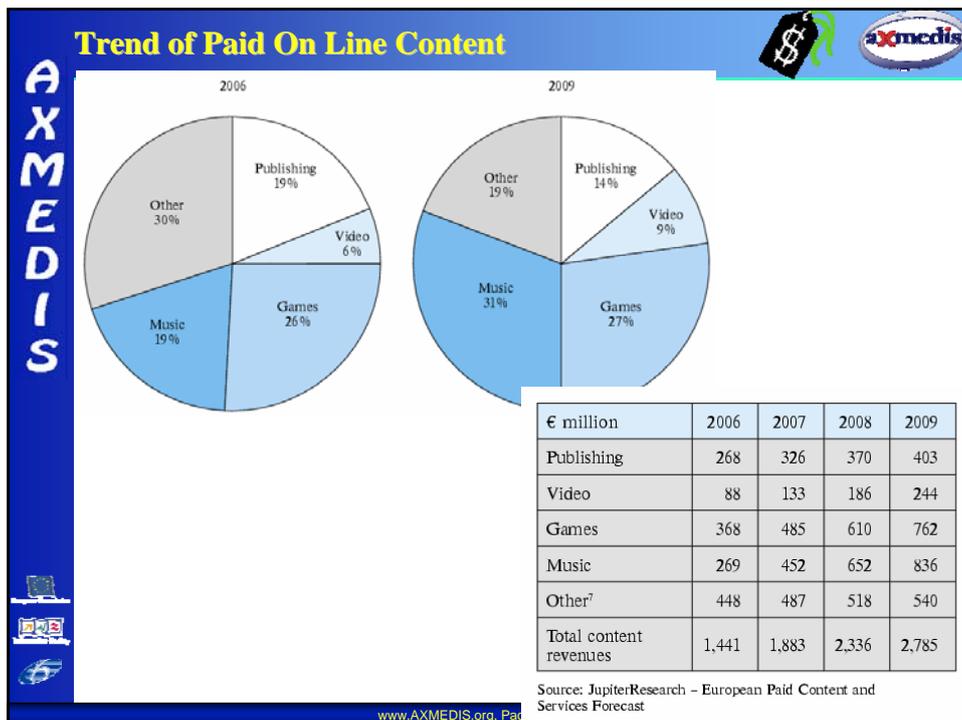
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Exploitation: Online content revenues

- Forecast of increasing revenues coming from online content
- Changes in user demand are forcing content owners, aggregators and distributors in making content available towards different distribution channels
 - ◆ Need to reduce costs for authoring and re-authoring
 - ◆ Need for a single content format suitable for multiple platforms

Total online content revenue by type of content in Western Europe (Meuro)

Year	Online music	Online games	Online video	Online publishing	Total
2004	~1000	~1000	~1000	~1000	~4000
2005	~1500	~1500	~1500	~1500	~6000
2006	~2500	~2500	~2500	~2500	~10000
2007	~4000	~4000	~4000	~4000	~16000
2008	~6000	~6000	~6000	~6000	~24000

* Source EITO 2005

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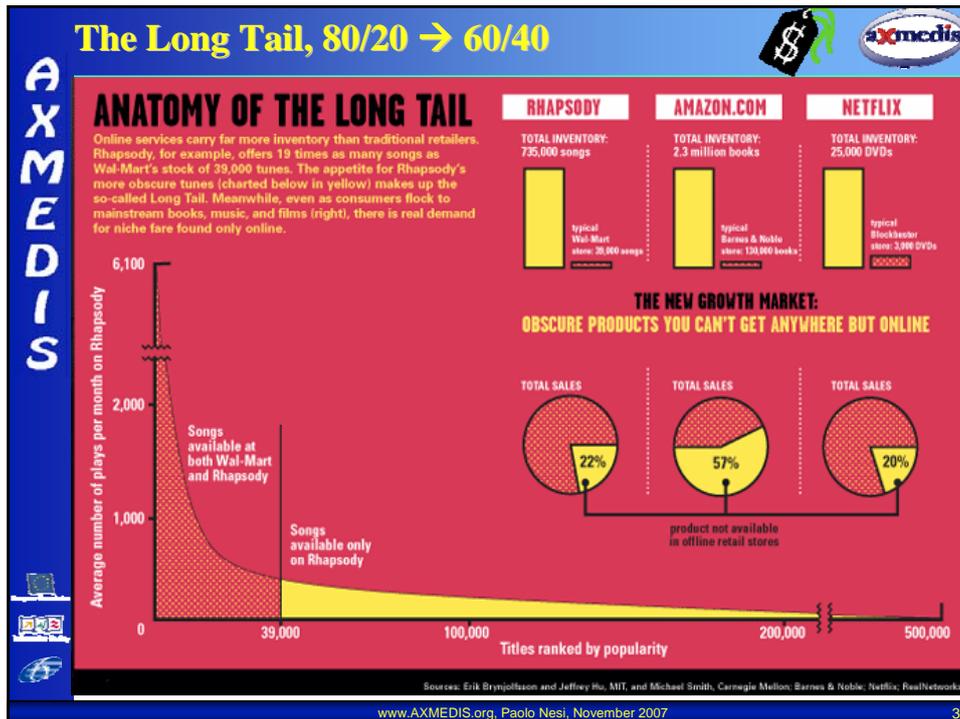
Grow AVG, Mill. Download files per year, EU 25, P2P

Year	France	Germany	Italy	Spain	United Kingdom	Poland	Sweden	Rest of Europe
2002	~1000	~1000	~1000	~1000	~1000	~1000	~1000	~1000
2003	~1500	~2000	~1500	~1500	~1500	~1500	~1500	~1500
2004	~2500	~4000	~2500	~2500	~2500	~2500	~2500	~2500
2005	~4000	~7000	~4000	~4000	~4000	~4000	~4000	~4000
2006	~6000	~10000	~6000	~6000	~6000	~6000	~6000	~6000
2007	~8000	~14000	~8000	~8000	~8000	~8000	~8000	~8000
2008	~11000	~18000	~11000	~11000	~11000	~11000	~11000	~11000
2009	~14000	~23000	~14000	~14000	~14000	~14000	~14000	~14000
2010	~17000	~29000	~17000	~17000	~17000	~17000	~17000	~17000

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Needs and the cure

- **Lower costs for**
 - ◆ production (packaging, protection, management, advertising, etc.), distribution and advertising
 - ◆ contract management, licensing, accounting, reporting, etc.
 - ◆ P2P distribution

- **Automation is THE cure/solution to**
 - ◆ reduce the costs
 - ◆ make the long tail access possible and convenient for all

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Contingency

- **Trend of the market for digital content:**
 - ◆ Audio and Video distribution growing
 - ◆ Issues regarding the market loss for piracy (60-80%)
 - ◆ Issues regarding the P2P as primary source of piracy
 - ◆ High costs of content production and distribution
 - ◆ long tail of content (the low of 80/20, 60/40)
 - ◆ High business risks
- **High demands on**
 - ◆ content interactivity
 - ◆ interoperability of content and devices
 - ◆ tools for cultural valorization of content
- **Issues on DRM**
 - ◆ Legal and technical capabilities
 - ◆ Lack of interoperability, openness
 - ◆ Flexibility in the business and transaction models
- **Massive processing in content production and distribution, and in license processing and event tracking**
- ***These are a real challenge for many industries that are discovering the complexity of managing large digital content factories and distribution chains.***




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User's Trends



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- **Users are gradually abandoning the traditional TV**
- **We can see that they**
 - ◆ Spend more time on PC/games console
 - ◆ Spend more money and time on i-TV
 - Cultural programme
 - Thematic information
 - ◆ Are more attracted by new content models and usages
 - ◆ Are more attracted by new devices,
 - ◆ Are interested in personal content publishing and sharing
 - YouTube, Video Google, etc.,
 - ◆ Are interested in Personal TV, personal realities,
 - ◆ Are more interested in individuality and personal needs,
 - ◆ Are interested in interactive and interoperable content
 - ◆ Are interested in home media centers and content management,
 - ◆ Etc,

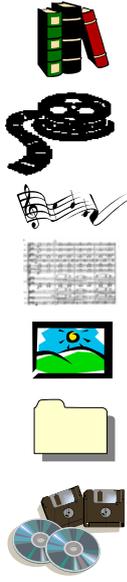
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Convergence, the Interoperable Content

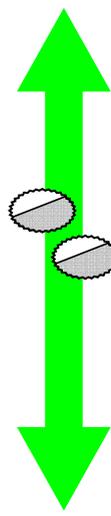


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- Internet Distributor
- Internet Distributor
- Mobile Distributor
- Broadcasters, DVB-H
- Media Distributor
- Broadcasters, DVB-T
- Broadcasters, DVB-S
- Kiosks distribution





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Present Needs for Accessing New Markets

- **Reduction of costs to access at the Fatter "Tail"**
- **Needs of Interoperable Content that may Migrate from**
 - ◆ one terminal/device to another
 - ◆ one user to another
 - ◆ one channel to another
 - ◆ Licenses assigned to users, devices or domains
 - ◆ etc.
- **Transcoding/Adaptation problems**
 - ◆ Content is packaged
 - ◆ Content is protected, adaptation of protected content is needed
 - ◆ Content contains several types of information: digital resources, metadata, glue, etc.
 - ◆ On the servers and/or on the client terminals
- **DRM Architecture has to support Migration and Adaptation**
 - ◆ see in the following

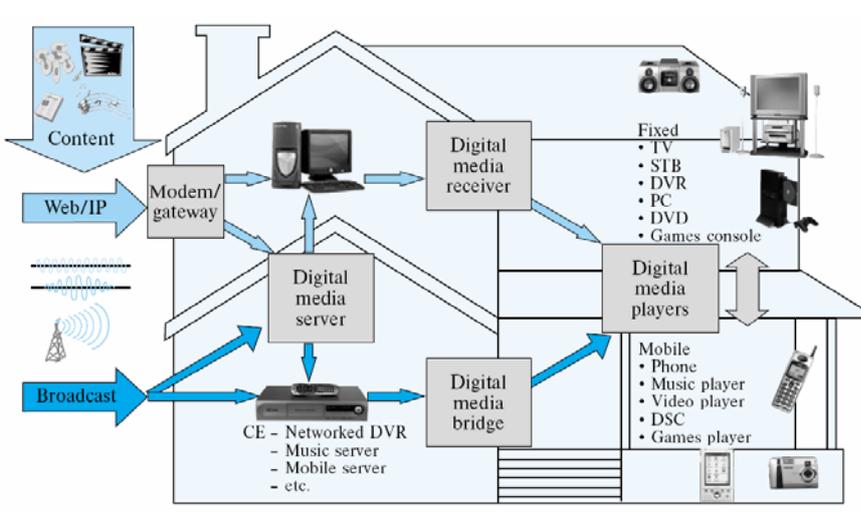
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The Media Usage at home



Source EITO2005

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Not enough interactivity and interoperability

- **Cross Media Content examples are:**
 - ◆ Interactive training material
 - ◆ documents with hyperlinks
 - ◆ interactive content in which the user may navigate
- **DVDs, WEB pages, eBooks, etc.**
 - ◆ mainly audio visual or textual
 - ◆ allow the inclusions of Simple Games (only DVD)
 - ◆ mainly for physical distribution (e.g., DVD)
 - ◆ eBooks and WEB pages are only digital distribution
 - ◆ low or absent interoperability among devices and distribution channels



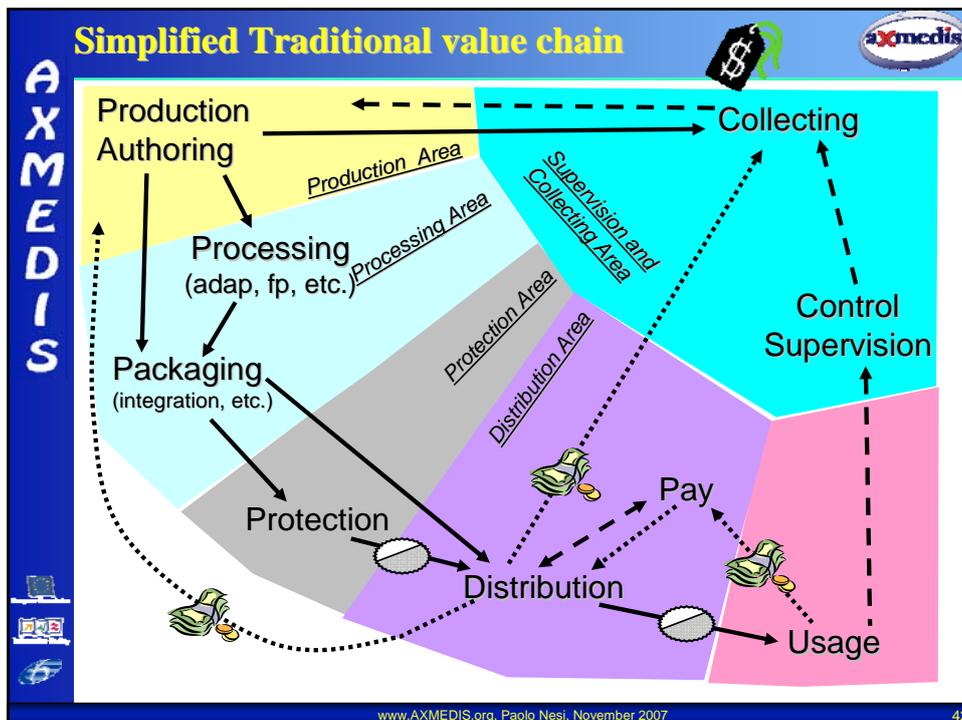
- **AXMEDIS Innovations**
 - ◆ more interactivity and interoperability among devices/players
 - ➔ Content moving among devices and player
 - ➔ The same content on difference devices
 - ➔ different media inside
 - ◆ flexibility in creating content packages
 - ◆ ...





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Traditional value chain Issues, state of the art




- **The protection is performed just before distribution**
 - ◆ By the distributor or
 - ◆ By a specialized third party company as a service
- **The B2B areas are (production, integration, etc.):**
 - ◆ Considered trusted
 - ◆ Based on paper contracts
 - ◆ Contracts are produced on the basis of a limited and not standard terminology, so that they are not easy interpreted and transported on other media, or channels, etc.
- **Producers and integrators have no control about what is done on the content in the last phase of distribution:**
 - ◆ authors and producers cannot verify, they may ask
 - ◆ integrators cannot verify, they may ask at the business partners
 - ◆ Etc.
- **The distributors:**
 - ◆ control the selling of content, mainly with conditional access systems
 - ◆ do not control/verify the exploitation of each single rights





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Aim of Digital Rights Management



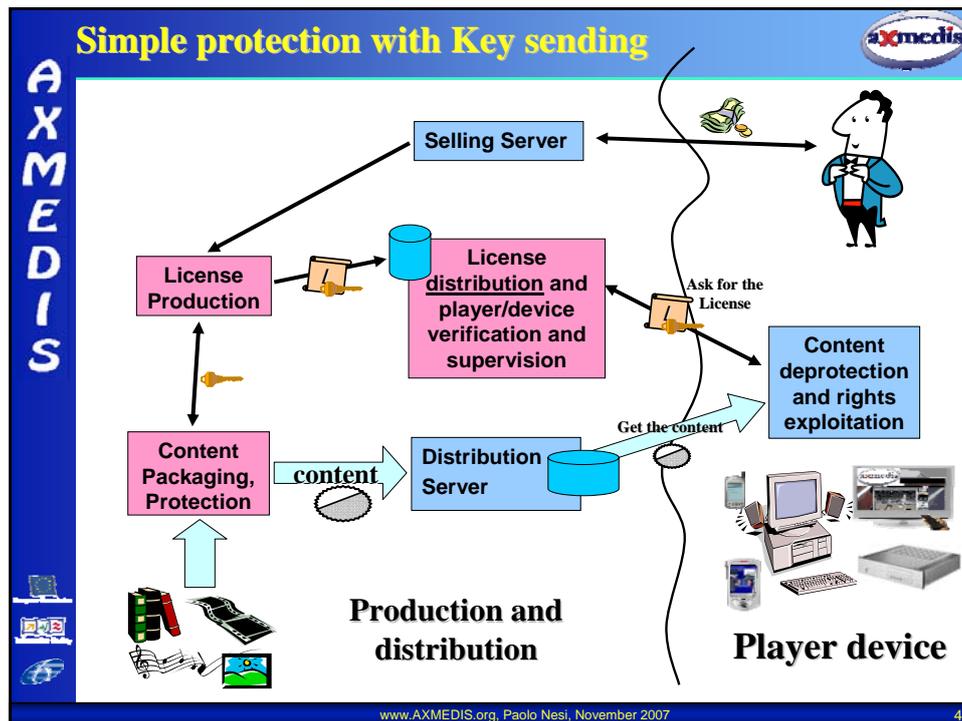
- **To prevent the non-authorized rights exploitation by who has not acquired the rights**
- **To allow accessing at the digital content functionalities in a controlled manner**
 - ◆ To who has been **authenticated/certified**
 - ◆ To do what (are the rights) is defined in a **License**
 - ◆ **Verifying/Control/Supervise** if the above conditions and others are respected
 - ◆ By using technologies to **protect content** (e.g., encryption, fingerprint, watermark, etc.)
- **To *Verifying/Control* if the allowed rights are respected**
- **There are some Cons, since the user is constrained:**
 - ◆ Registration of users
 - ◆ Authentication of users and/or tools/terminal/devices
 - ◆ Control of users
- ***It has to be supported by a set of additional technical solutions***





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- ### Technologies and standards
- **Technologies for content protection**
 - ◆ Microsoft Windows Media, DRM
 - ◆ Apple I-Tune
 - ◆ Media Commerce Suite of Real Network
 - ◆ Intertrust
 - ◆ Liquid Audio
 - ◆ DMD secure
 - ◆ Adobe
 - ◆ And also the Conditional Access Systems:
 - Nagravision, Irdeto, etc...
 - **Standards on DRM**
 - ◆ OMA, Open Mobile Association
 - ◆ MPEG-21, DI, DID, IPMP, REL, etc.
 - ◆ XrML, Content Guard, related to MPEG-21
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Market solutions viz AXMEDIS	
Business Models	Larger number of Business Models
B2B DRM	B2B, B2C, B2B2C DRM solution
Proprietary / Standard DRM and model	Standard DRM: MPEG-21, OMA, etc.
Non interoperable DRM	Allowed Interoperable DRM: MPEG-21, OMA, etc.
Fixed/Flexible Protection Model	Any Protection Model, key, algorithms, etc.
Separation among Content and license	Separation among Content and license
Signed Content Header	Signed Content AXINFO, any Metadata
Channel distribution	Multichannel with the same license
Players and Devices	Players and Devices: PC MS-Windows, PDA Windows Mobile, STB, Linux OS, Apple MAC, Mobiles
License Proprietary: number of rights	Licenses MPEG-21 REL: Expandable dictionary, Any type of rights, Licenses OMA
Authentication of Player	Authentication of device, user, domain, etc.
Revocation per Player	Revocation per device, user, etc,
Revocation per license	Revocation per license
digital resources that can be included and protected	Any digital format, of any type
Media content	Single audio, video, image, doc, and Cross media: SMIL, HTML, SVG, MPEG-4,...
Customizable Tools	Customizable Tools: servers and player clients

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- ### Limitations of Present DRM solutions
- **DRM is typically added only in the Integration or distribution phases**
 - ◆ **DRM is seen mainly for B2C**
 - Added by distributors
 - Owners demand to producers
 - Producers demand to integrators or distributors
 - Some Distributors demand to carriers
 - ◆ **DRM is tuned for a specific distribution channel and media**
 - Windows Media DRM for PC/internet, etc.
 - OMA DRM for Mobile
 - Etc.
 - ◆ **No convergence**
 - no interoperability of content
 - No possibility of assigning a License to a Domain
 - Partially solved producing content in several formats for several channels and terminals, very complex and expensive
 - ◆ **Large Limitations for the final users**
 - ◆ **Limitations for the business and markets**
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Business Rules, a way to formalize allowed rights

- **Exploitation Models (contracts from the consumers to the provider are aligned to the exploitation model):**
 - ◆ Subscription to a collection or service
 - ◆ All you can eat
 - ◆ Pay per renting
 - ◆ Pay per use, pay per play, pay per print, etc.
 - ◆ Pay per stream, per download, etc...
 - ◆ Pay per minute all you can eat
 - ◆ Pay per burning the CD
 - ◆ Pay per copy the object
 - ◆ Pay per moving the object
 - ◆ Pay per passing the object to a different device
 - ◆ Pay per building a collection
 - ◆ Preview without paying
 - ◆ Try and buy
- **Etc.**




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B2B Rights Management

- **Advantages of B2B DRM**
 - ◆ Automation of contract-based deals
 - ◆ Assessing the Usage in the B2B
 - ◆ Reducing costs of B2B promotion
 - ◆ Allowing integration and composition of protected content
 - ◆ Allowing content production on demand, no contracts signatures, immediate DRM processing
 - ◆ Try and buy, try and use for business
 - ◆ Free try for Business users
 - ◆ Increasing the control, decreasing the risk
- **P2P distribution**
 - ◆ sharing of content
 - ◆ lower costs to access content
 - ◆ Lower costs to promote/distribute content
 - ◆ Increment of accessible content




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Summary of Major Needs

- **Convergence of content distribution and usage**
 - ◆ Multichannel solution
 - ◆ create/buy one to use on many devices
 - ◆ Interoperable Content and Devices
 - ◆ Interoperable DRM, Licenses
- **Content management in the home**
 - ◆ the domain management
 - ◆ Interoperability of content in the home, interoperability of the devices, the Home Media Server
 - ◆ Multimedia Middleware among devices
 - ◆ Integration with domotic applications and tools





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Summary of Major Challenges

- **Reduction of production, protection and distribution costs**
- **Content production/protection on demand**
- **Automating the B2B area, DRM and distribution**
 - ◆ Production, protection and distribution phases
 - ◆ Expanding DRM to B2B
 - ◆ Reducing costs of B2B distribution
- **Real Time content Processing**
 - ◆ Reducing production and distribution costs
 - ◆ Flexible Content Distribution
 - ◆ Content production, protection, distribution on demand
 - ◆ Adaptation and transcoding
 - ◆ Accelerating B2B processing
- **Increasing security: rights usage and control on**
 - ◆ Harmonization of B2B and B2C
 - ◆ Increasing security and interoperability
 - ◆ Increasing control of rights exploitation
 - ◆ Allowing the set up of a large number of business models
- **Any other question/issue ??**





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	● Short Market Analysis and Opportunities
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	● AXMEDIS Content Packaging 
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	◆ Content Models vs DRM models
	◆ Content Model and hierarchy
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● AXMEDIS Application Scenarios	
● Conclusions and references	

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AXMEDIS Content Elements	
A X M E D I S	● Content Packaging for protection and distribution
	◆ Streaming (so called real-time) and/or downloading
	◆ Sharing on P2P, etc..
	◆ portable on physical supports, etc. (scalable)
	◆ binary and/or XML, etc.
	● Real Cross Media
	◆ Multimedia hierarchies of digital resources such as models based on: <ul style="list-style-type: none"> → HTML, SMIL, SCORM/IMS, WEDELMUSIC, MPEG-4, etc. → With internal and external links and relationships: <i>for example one HTML page may be build by using several images and audio files.</i>
	◆ Integration of docs, audio, video, images, via spatial rendering and synchronization, providing interactivity
	● The Content Package in the hands of the final user to be used may need of the following information
	◆ Metadata.....
◆ Digital Resources.....	
◆ Protection Information.....	
◆ License.....	

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AXMEDIS Metadata

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- **Metadata:**
 - ◆ Identification of information,
 - unique ID (AXOID), UUID,
 - distributor ID, UUID,
 - other codes such as: ISRC, ISBN, etc.
 - Producer ID and Information, etc.
 - Author Information, etc.
 - ◆ Classification information also for indexing:
 - Dublin core, etc.
 - ◆ PAR: Potentially Available Rights 
 - ◆ Descriptors: for indexing, MPEG-7, technical and conceptual, etc.
 - ◆ References to Owner, to Distributor, etc.
 - ◆ Fingerprint
 - ◆ Historical and versioning aspects
 - ◆ Etc.
- **Some of them are grouped in AXMEDIS format in the so called AXMEDIS Information, AXINFO**
- **One Metadata set for each resource or group, ITEM**



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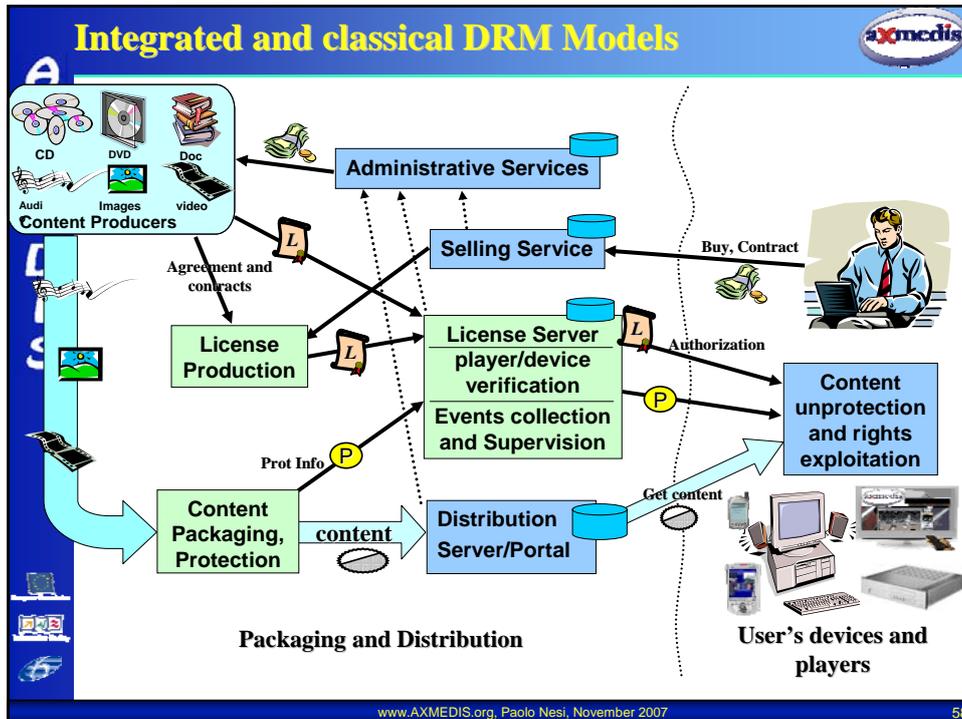
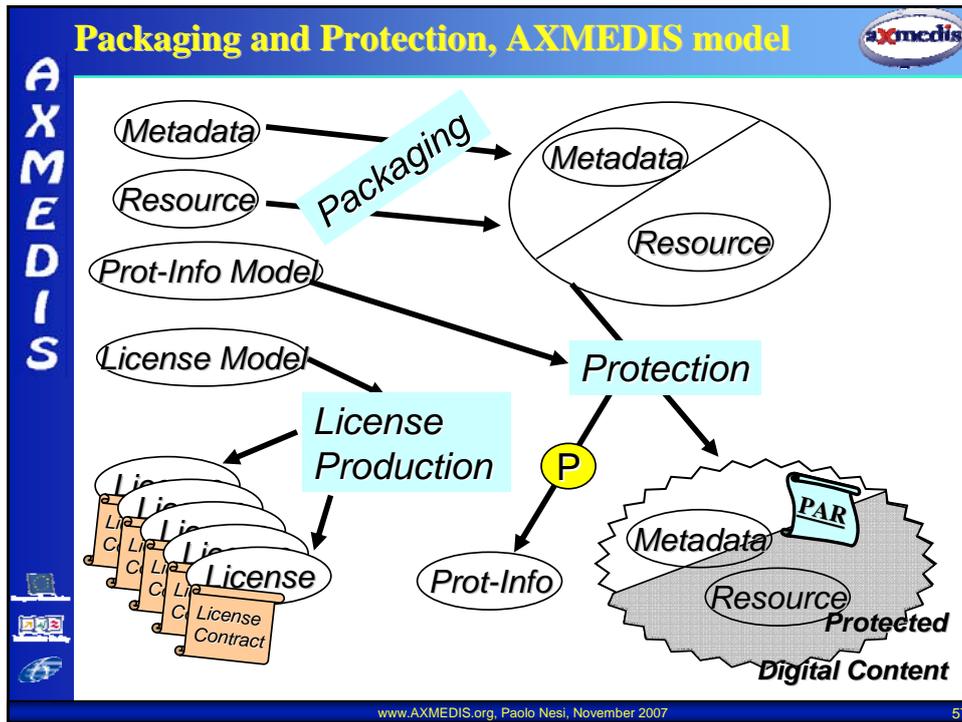


AXMEDIS Content Elements

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- **Digital Resources:** 
 - ◆ Any digital information: images, docs, txt, video, game, application, xml files, audio, animation, etc.
 - ◆ Hierarchy of digital resources, nesting levels
 - ◆ Internal and external links: e.g., HTML navigation, SMIL references, MPEG-4 paths..
- **Protection Information:**  → 
 - ◆ What has to be done to access (unprotect) a given information/resource
 - ◆ Protection Tools used, their parameters, etc.
- **License:**  → 
 - ◆ Which rights are provided, who is the recipient, what are the conditions, etc.

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The Cross Media Content Model

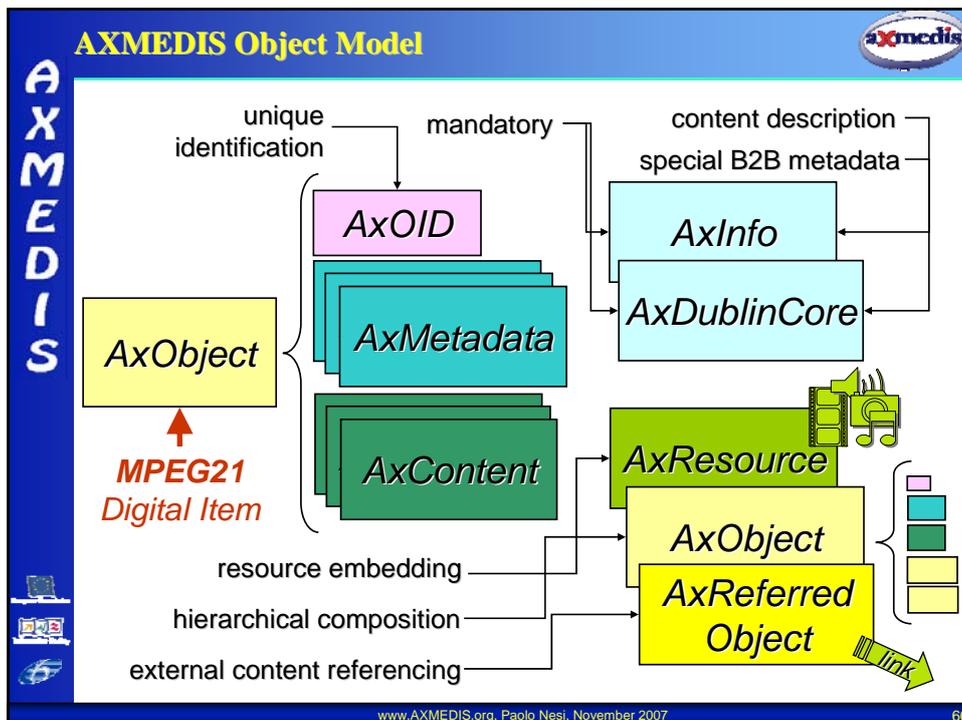
AXMEDIS



- **Based on MPEG21 Digital Items, but not limited to**
- **Overcoming limitations in content modeling and DRM:**
 - ◆ Cross media:
 - any kind of metadata and any kind IDs
 - presentation and glue (e.g., HTML, SMIL,), plus
 - digital resource images, documents, video, audio, games, MPEG-4, etc.;
 - ◆ Content components: composition and reuse;
 - ◆ DRM interoperability: MPEG-21 and OMA
 - ◆ DRM Chain of licenses: B2B and B2C integration;
 - ◆ Integration of semantics and behavior into the content.
- **DRM, Digital Rights Management**
 - ◆ Modeling licenses for the B2B-B2C areas
 - ◆ Algorithms and tools for processing licenses, chains and relationships
- **Supporting legal/secure P2P for B2B and B2C/C2C**
- **Supporting B2B-B2C content production and transactions,**
 - ◆ for protected and non protected objects

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AXMEDIS hierarchical objects

MD
Protected Digital Content

MD
Ref to Protected Digital Content

MD

MD
Protected Digital Content

Nesting levels of Objects

References to external Objects

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AXMEDIS Editor: some examples

VIDEO
see links in the last page to download the videos

Nome file: [] Apri

Tipo file: AXMEDIS (*.axm) Annulla

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- AXMEDIS Content Packaging
- **AXMEDIS Content Protection and Tracking**
 - ◆ Digital Rights Management
 - ◆ Protection Technologies
 - ◆ License Models and Processing
 - ◆ Rights Monitoring, Tracking and Reporting
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AXMEDIS Digital Rights Management




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- To allow accessing at the digital content functionalities in a controlled manner
 - ◆ To who has been registered the first time and continuously: **authenticated and certified**
 - ◆ To do what is defined in a **license** (to allow exploiting the rights)
 - ◆ By using technologies to **protect content** (e.g., encryption, fingerprint, watermark, etc.)
 - ◆ **Verifying/Control/Supervise** if the above conditions and others are respected



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Managing License and Protection Information

Metadata
Resource Protected
Digital Content

License
License Contract

Prot-Info P

- **Once obtained the content a license is needed to exploit the right you have acquired,**
 - ♦ or at least you need a server that verify that you are authorized to exploit some right and provide you the Authorization
- **Once you are Authorized to exploit the rights you may get a reference to**
 - ♦ the Protection Information to Unprotect the specific object segment and/or digital resources
- **License and Protection Information are typically located in external and remotely located Servers**
 - ♦ but may be cached on the terminal device if allowed by the license issuer
- **During all these phases the AXMEDIS Certifier and Supervisor verify integrity and certificate**

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The Protection and Control Process

1 Registration for Authentication → AXMEDIS or Distributor Registration Site

4 5 Content Access → Any Distributor front end Server

5 4 Business Transaction → Transaction front end Server

2 Installation → AXMEDIS Compliant Players

6 Usage ↔ Control and Supervision ↔ AXMEDIS Protection Manager

6 Control and Supervision → AXMEDIS Certifier and Supervisor

3 Tool Certification → AXMEDIS Certifier and Supervisor

AXMEDIS Compliant Players

AXMEDIS Protection Manager

AXMEDIS Certifier and Supervisor

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License Definition and Processing




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- **License:**
 - ◆ digital version of the contract
 - ◆ contains the list of acquired rights
 - ◆ may be signed by clicking
 - ◆ supported by a way to demonstrate its authenticity
 - ◆ can be stored in the digital object or not
 - If not, may in the terminal or remotely located
 - ◆ may refer to other licenses, creating a chain of licenses for the evaluation of each given grant associated to a right
 - ◆ formalized in some language
 - Refer to some dictionary for terms that define the semantics of the expressions of the language
 - ◆ may be revoked
 - ◆ Etc.





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AXMEDIS License formal language




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- **AXMEDIS License**
 - ◆ Derived from MPEG-21REL
 - ◆ Support for RDD: Rights Data Dictionary
- **MPEG-21 RELRights Expression Language**
 - ◆ Derived from XrML
- **XrML 2.0: eXtensible rights Markup Language**
 - ◆ At the basis of the MPEG-21 REL
 - ◆ ContentGuard, Nov. 2001, Microsoft
 - ◆ At the basis of the Windows Media
 - ◆ Derived from DPRL
- **OMA ODRL: Open Digital Rights Management**
 - ◆ Expression language for mobiles
 - ◆ Simpler than MPEG REL
 - ◆ Under certain restriction is compatible with AXMEDIS license
 - ◆ ..





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AXMEDIS DRM Aspects

- **Formal definition of Licenses as MPEG-21 REL**
 - ◆ Facilitate the passage from Contract to Digital Licenses and viceversa
- **Support and make easier the B2B market of digital content, and cross media content**
 - ◆ Content composition and DRM management
 - ◆ Tracking and monitoring the exploitation of rights
 - ◆ Reduction of costs for B2B trading of content
 - ◆ Enforce flexibility in business and transaction models
 - ◆ Harmonize and automating B2B and B2C
 - ◆ Management of domains
- **Enable interoperability among different**
 - ◆ distribution channels and devices with their DRM
 - TV, PDA, mobile, kiosks, broadcasting,...
 - ◆ DRMs models: MPEG-21 and OMA, other can be added
- **Enabling**
 - ◆ Content production on the consumer side
 - ◆ secure/legal P2P content sharing for both B2B and B2C

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MPEG-21 REL data model

```

    graph TD
      right[right] -- issued to --> principal[principal]
      right -- associated with --> resource[resource]
      right -- subject to --> condition[condition]
    
```

- **REL grant consists of**
 - ◆ principal to whom grant is issued
 - ◆ rights the grant specifies
 - ◆ resource to which right in grant applies
 - ◆ condition to be met before grant can be exercised

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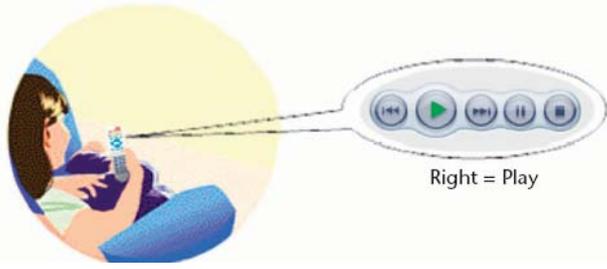
An example of REL statement



Condition = November 2003



Resource = Ocean Wilds



Right = Play

- Rosy can Play 3 times the Ocean Wilds in November 2003.

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Possible values for terms

- Principal
 - ◆ AllPrincipals and KeyHolder
- Rights
 - ◆ Issue, Obtain, PossesProperty and Revoke
- Resources
 - ◆ DigitalResource, Revocable and ServiceReference
- Conditions

<ul style="list-style-type: none"> ◆ AllConditions, ExerciseMechanism, ExistsRight, Fullfiler, PrerequisiteRight, RevocationFreshness, ValidityInterval ◆ CallForCondition ◆ ExerciseLimit ◆ FeeFlat ◆ FeeMetered ◆ FeePerInterval ◆ FeePerUse ◆ FeePerUsePrePay ◆ SeekApproval 	<ul style="list-style-type: none"> ◆ Territory ◆ TrackQuery ◆ TrackReport ◆ TransferControl ◆ ValidityIntervalFloating ◆ ValidityIntervalStartsNow ◆ ValidityTimeMetered ◆ ValidityTimePeriodic
--	---

- Examples of Rights
 - ◆ Adapt
 - ◆ Delete
 - ◆ Diminish
 - ◆ Embed
 - ◆ Enhance
 - ◆ Enlarge
 - ◆ Execute
 - ◆ Install
 - ◆ Modify
 - ◆ Move/Migrate
 - ◆ Play
 - ◆ Print
 - ◆ Reduce
 - ◆ Uninstall
 - ◆ Burn
 - ◆

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Managing License Chain, B2B and B2C

```

    graph LR
      Alice[ALICE] --> Bob[BOB]
      Alice --> subLicense[subLicense Contract]
      subLicense -.-> Bob
      Bob --> Carl[Carl]
      Bob --> subsubLicense[subsubLicense Contract]
      subsubLicense -.-> Carl
  
```

- **Alice states** "Bob has the right to issue a license to anyone to print the book in Italy"
- **Bob states** "Carl has the right to print the book in Italy"
- To solve the SubSubLicense for Carl all the connected Licenses are needed
- Licenses have to be accessible on Processing Engine

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Cross media content and composition

- AXMEDIS objects can be used as components for creating other added values AXMEDIS objects
 - ◆ Allowing the production for composition of protected content, creation of added value objects,
 - ◆ Allowing the Rights Management Of Composition, RMOC, in the digital world similarly at what is performed in the physical world
 - ◆ The shares along the value chain are de facto formalized
 - ◆ Who is composing can add its own protection and licensing

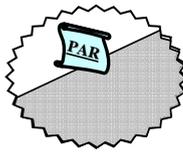
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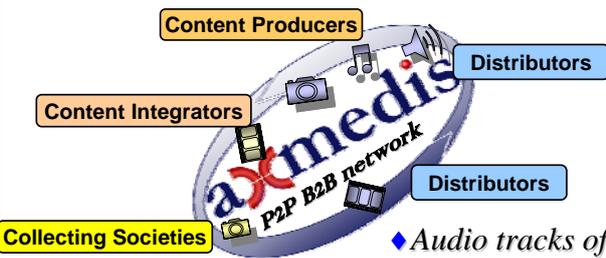
Make easier the B2B market of digital content

AXMEDIS



- REL and Composition enforce flexibility and openness in business transactions
- PAR: Potentially Available Rights into AXMEDIS objects
 - ◆ PARs based content trading
 - Customers may know directly which rights they could buy and by who
 - Querying can be performed on DBs and P2P
 - ◆ PARs may be used to harmonize and automate B2B and B2C







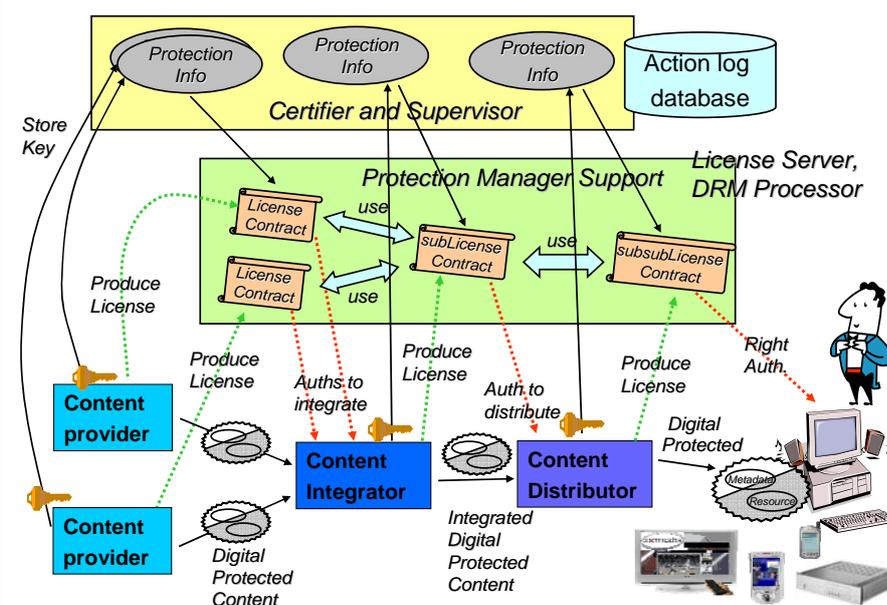
◆ Audio tracks of Bocelli for Audio broadcasting for June 2008 in Gemany?

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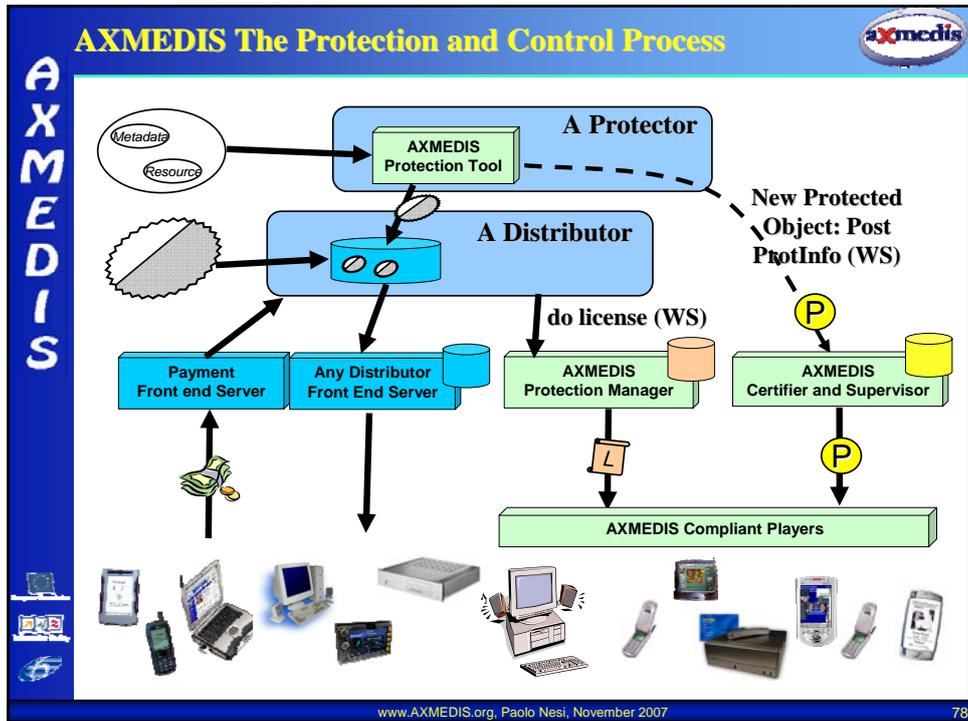
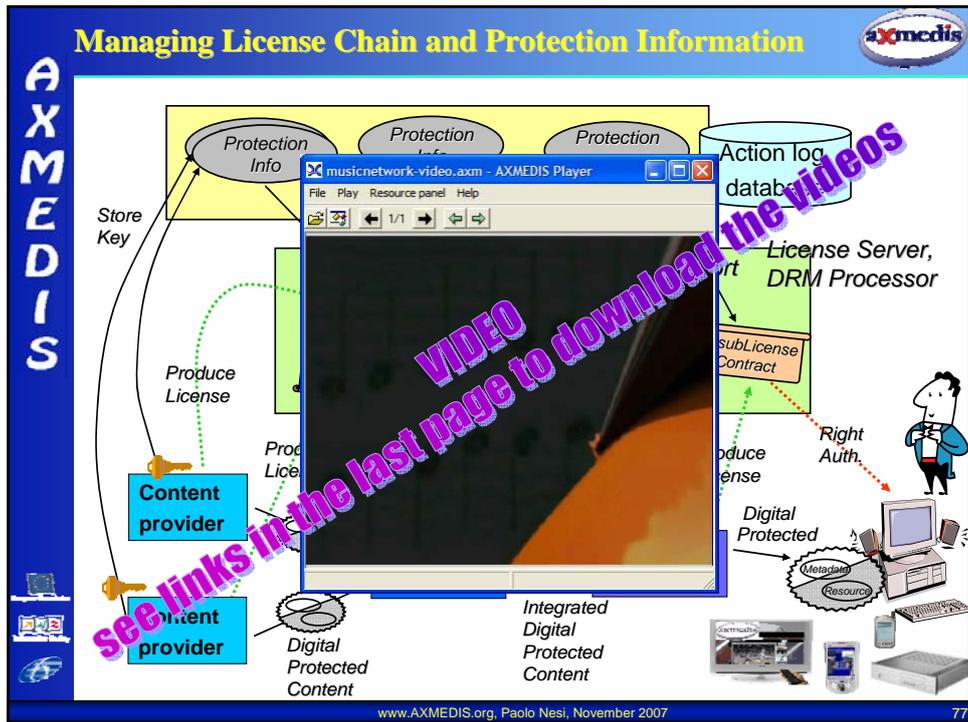
Managing License Chain and Protection Information

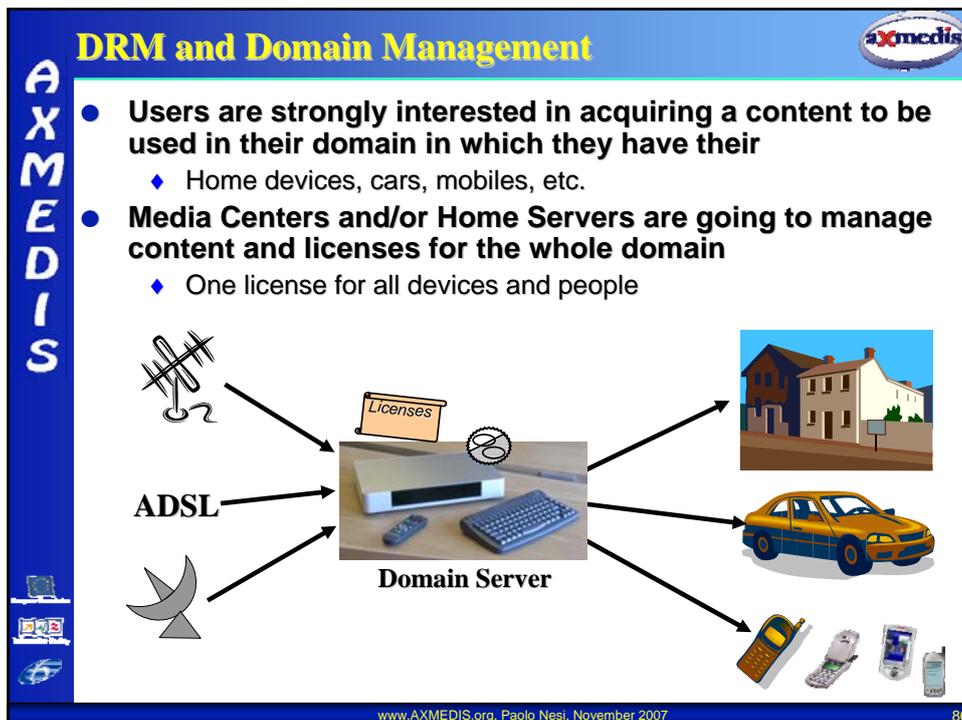
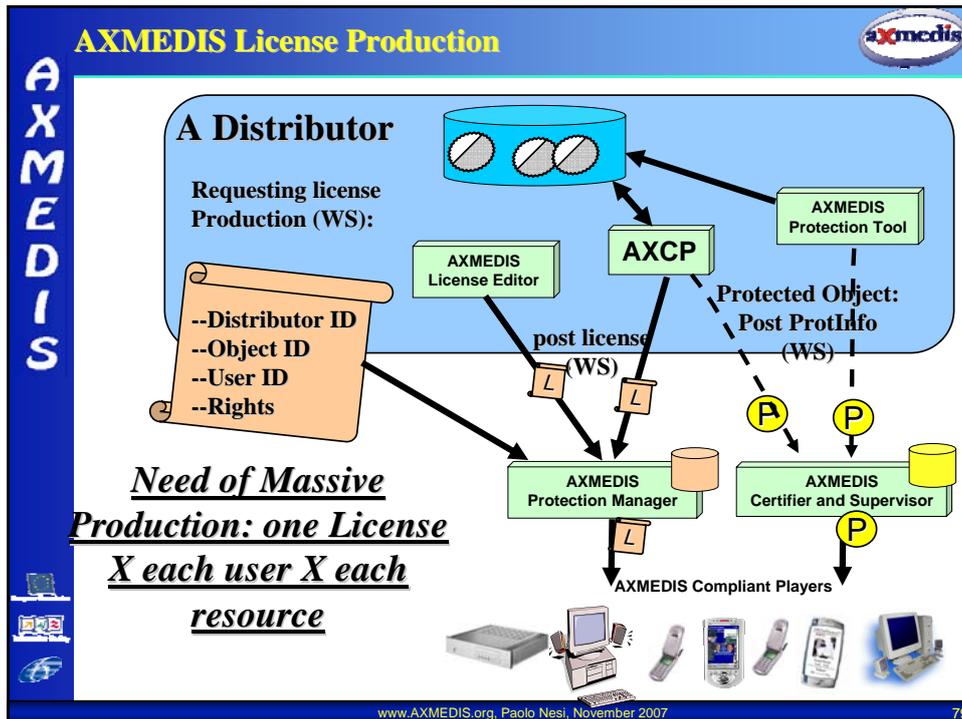
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AXMEDIS Control and Supervision

- Performed by the: AXCS and AXMEDIS PMS
- Continuously verify and certify the trusting level of the Tool/Device/Terminal and of the User
- Collect Action Logs (event logs) related to rights exploitation and thus to License usage
- Allow the implementation of black lists for Users, Tools, Devices/Terminals, Licenses

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Tracking and monitoring Exploitation of Rights

- REL and Composition enforce flexibility in business and transaction models, multiple models for the same channel
 - ◆ Pay per play, all you can eat, subscription, etc. etc.
- Different reports and statistics for different roles
 - ◆ Reports on licensing and on the consumption/exploitation of rights

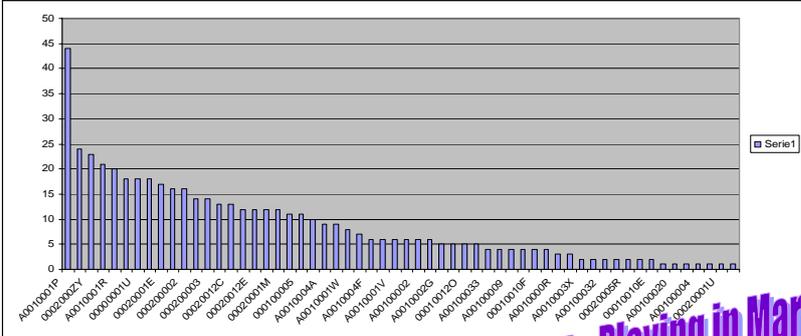
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Event reporting

- **Single traces, events, etc.**
- **Statistical data for reporting and analysis**



Distribution of exploited objects Playing in March

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List of Events/Actions on rights Exploitation

- **Collecting Events and Actions**
 - ◆ Further reporting
 - ◆ Further verification of consistency
 - ◆ provide the evidence about the exploitation of rights to: content owners, producers, collecting societies, distributors, etc.
 - ◆ provide the billing information to the final user
 - ◆ provide the statistical information
- **Counting the usage, exploitation of rights**
 - ◆ how many times a music piece has been played, how many print out have been produced, etc.
 - ◆ Dynamic definition of price for example...
- **Extending MPEG-21 Event Reporting**
 - Specifies how to express ER-Request and Event Report and how they are represented as digital item

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DRM Interoperable

- **DRM, Digital Rights Management**
 - ◆ Digital management of rights
- **Proprietary DRM solutions are**
 - ◆ based on *proprietary* formats for content and licenses, protection information, control messages, and reporting, etc.
- **DRM Interoperable (e.g., DMP, OMA)**
 - ◆ based on a **UNIQUE** Standard format for content and licenses, protection information, control messages, and reporting, etc.
 - ➔ Extensions are not accepted if not decided by the standard body
 - ➔ Standards are becoming obsolete in short time, patent pending is blocking the market
- **DRM Interoperable “a la AXMEDIS”**
 - ◆ based on **SEVERAL** standard formats (now MPEG-21 e OMA) e/o *proprietary* for content and licenses, protection information, control messages, and reporting, etc.
 - ◆ Interoperable on the B2B and B2C areas
 - ◆ It can be extended to accept other *solutions* for example MS Windows DRM, i-Tune, or more, etc.




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Considerations

- **AXMEDIS License:**
 - ◆ Formalized in MPEG-21 REL
 - ◆ Can be used for formalising both B2B and B2C
 - ◆ Can be interoperable with OMA licenses
 - ◆ Can address single users, devices or domains
 - ◆ Can be produced
 - ➔ **Manually** with AXMEDIS DRM Editor
 - ➔ **Remotely** by using a WEB service
 - ➔ **Massively** and **remotely** by using AXMEDIS content processing tools
 - ◆ Processed in the chain of licenses
 - ➔ by the AXMEDIS Protection Manager Support as License Server/DRM Processor
 - ◆ Can be included into AXMEDIS objects or can be provided independently
 - ◆ Can be cached or not on the client terminal
 - ◆ Can formalize a large set of business models
 - ◆ Etc.
- **Any other question/issue ??**






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Considerations

- **AXMEDIS DRM integrated solution:**
 - ◆ Allows usage of DRM on new object types such as Cross Media content: SMIL, HTML, etc.
 - ◆ Allows the control on multichannel distribution
 - ◆ Support multiple business models in the same and on different channels
 - ◆ Support with a unified DRM both B2B and B2C areas
 - ◆ Continuously Controls user terminals
 - ◆ Collects Actions Logs of any kind of event
 - ➔ Allows to bring back easily the Action Log on your Administration
 - ➔ Provides the evidence of the exploited rights
 - ➔ Provides statistical data on the rights exploitation
 - ◆ Manages black lists of several Entities
 - ➔ Allows the definition of policies for putting user, device, license, objects, etc. into the black lists
 - ◆ Etc.
- **Any other question/issue ??**



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- AXMEDIS Content Protection and Tracking
- **AXMEDIS Content Production and Processing**
 - ◆ AXMEDIS Editors, Authoring
 - ◆ AXMEDIS players
 - ◆ Automated AXMEDIS Content Processing and Production
 - ◆ Multichannel Back-Office Management
 - ◆ Production of Content on Demand
- AXMEDIS Application Scenarios
- Conclusions and references



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Major Tools

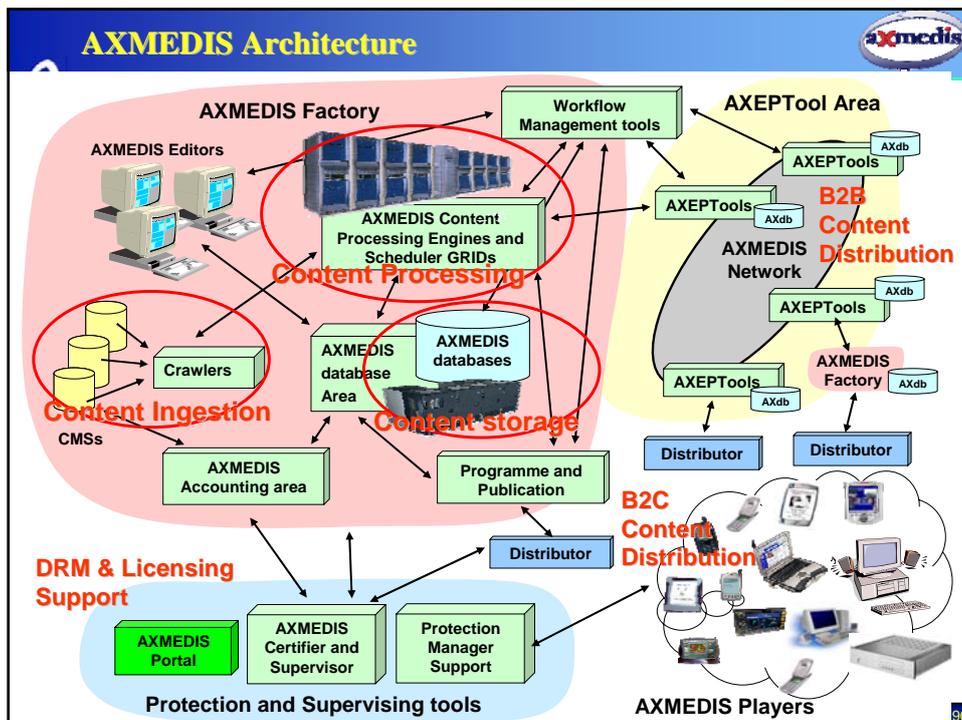
AXMEDIS



- **Players for cross media content:**
 - ◆ PC, PDA, STB, mobiles, etc.
- **DRM and protection support**
- **Content Production tools**
 - ◆ Authoring tools for cross media content: AXMEDIS Editor
 - for content, protection and licenses
 - ◆ Automated production tools for content, protection packages and licenses: AXCP, Workflow
 - ◆ CMS: search and retrieval, automated connection with your own and/or third parties CMSs
- **Content Distribution**
 - ◆ P2P tools for B2B and C2C in a controlled and safe/legal manner: AXEPTool, AXMEDIA
 - ◆ User and tool Registration portals
 - ◆ Certification authority, AXCA
 - ◆ License Server and Certifier and Verificator, PMS/AXCS
 - ◆ Scheduling: Program and publication, Workflow, etc.
 - ◆ Distribution Portal
 - ◆ Content acquisition portal for end user production

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AXMEDIS

AXMEDIS Cross Media Content



Any content inside a package:

- ◆ Video, Audio, Documents, Images, games, animations, WEB pages, tools, etc.
- ◆ compliant and extend MPEG-21

Packing content that can

- ◆ create content for other devices, etc.
- ◆ satisfy social activity, user annotations, user content production, etc.
- ◆ be digitally streamed on TV (DVB-T/DVB-S/DVB-H) with the same level of interactivity
- ◆ be protected with the needed flexibility
- ◆ be distributed on different terminals/devices and via different channels.
- ◆ be customized for culture and language



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AXMEDIS

Interoperability among devices



The user likes interoperability among devices, e.g., getting

- ◆ a video for the TV and reproducing it on mobiles, PC, etc.
- ◆ an MP3 audio track and using as ringtone in the phone, reproducing it on the car stereo, or in the living room, passing to a friend.
- ◆ a guide in a museum for his mobile, using there, and passing and playing it at home on the TV set
- ◆ Etc.....

AXMEDIS interoperability satisfies these demands among a large set of devices:

- ◆ PC, STB/PVR/HDR, PDA, Mobiles, etc.
- ◆ You can buy once to use on all



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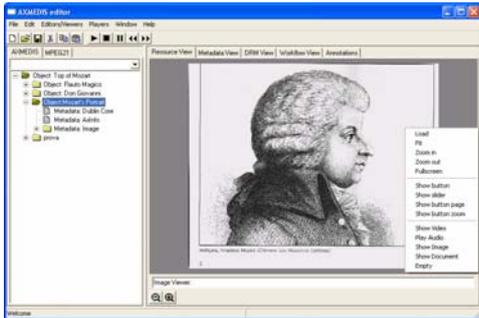
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AXMEDIS Authoring Editor

- **The AXMEDIS Editor is an application allowing**
 - ◆ manual production of AXMEDIS objects
 - ◆ inspection of automatically produced objects
 - ◆ finishing AXMEDIS objects pre-produced automatically
- **It integrates many Editors & Viewers to handle all the aspects of the AXMEDIS Objects production**
 - ◆ Resource
 - ◆ OBJ Composition
 - ◆ Metadata
 - ◆ DRM/Licenses
 - ◆ Protection
 - ◆ Presentation
 - ◆ Behavior
 - ◆ Etc....



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AXMEDIS Client Tools

- **AXMEDIS/MPEG-21 Model plus a set of players**
 - ◆ Audio and video players: almost any format
 - ◆ Document viewers: PDF, HTML, etc.
 - ◆ Image viewers: any format
 - ◆ Cross media: MPEG-4, SMIL player, HTML, etc...
 - ◆ Etc.
- **AXMEDIS Metadata support**
 - ◆ AXInfo, Dublin Core, etc.
 - ◆ Any descriptors, etc.
- **Possible integration AXMEDIS AXOM core module in any player**
 - ◆ The access to the AXMEDIS Framework allows you to create in short time your customized AXMEDIS compatible player in many platforms based on AXOM:
 - ➔ Windows
 - ➔ Linux
 - ➔ PDA, Windows Mobile 5
 - ➔ Etc.

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Interoperable Players

PC players with full functionalities

- ◆ Stand Alone Player for Windows
- ◆ Version with Replaceable skins
- ◆ Active X Player for Windows, for:
 - ➔ Integrating player in Html pages
 - ➔ Microsoft Internet Explorer Browser
 - ➔ Macromedia tools Authorware
 - ➔ Realising customised AXMEDIS Players based on .NET
- ◆ Plug in for Mozilla Internet Browser
 - ➔ Integrating player in Html pages
 - ➔ Two different skins

PDA player:

- ◆ MPEG-4, SMIL, HTML

STB player:

- ◆ for IPTV
- ◆ for DVB-S
- ◆ MPEG-2, MPEG-4

Mobile player:

- ◆ A pure Java player will be ready for October 2007
- ◆ SMIL support with Audio Visual, MMAPi of Java

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AXMEDIS Players, interaction, SMIL, HTML, MP4...

AXMEDIS

see links in the last page to download the videos

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Cross media Player as Active X, for MS IE and .NET applications

The slide displays two examples of the AxMedis Player. The left player is embedded on a website for the Italian Football Federation (FIGC), showing a match between Italy and Germany in 2002. The right player is embedded on a website for Spider-Man, showing a trailer for the movie. Both players are running in a window titled 'AxMedisPlayer'.

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AXMEDIS Players: videos, SMIL, HTML,

The slide shows a video player interface with a 'Wait' dialog box overlaid. The dialog box contains a progress bar and a 'Wait' button. A large pink diagonal text overlay reads 'see links in the last page to download the videos VIDEO'.

see links in the last page to download the videos VIDEO

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AXMEDIS Player for PDA with SMIL/MPEG-4

more than 2000 years ago. In a very similar fashion the various angels are offering and launching several kind of flowers, some of them are typical of regions very far from Palestine, some are typical of mountain environment. Others are used just because in western tradition (an in particular in Italian one) had a very special meaning like the Bellis Perennis (daisy), which is used to represent Christ's incarnation. Similarly the Centaurea Cyanus (cornflower) was associated to Christ's death and resurrection. In the overall in the aside painting there are depicted around 30 different kinds of flowers (red lines delimitate painting portions holding most of them), each with a specific purpose in the composition and holding a symbolic meaning. Pupils will have to find out how many of the presented flowers

MPEG-21

HTML, SMIL and/or MPEG-4 PDA-player

GIUNTI labs tiscali

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PDA player

see links in the last page to download the videos

AXMEDIS

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AXMEDIS

AXMEDIS Player for STB, PVR, Decoders, etc.

STB with AXMEDIS tech

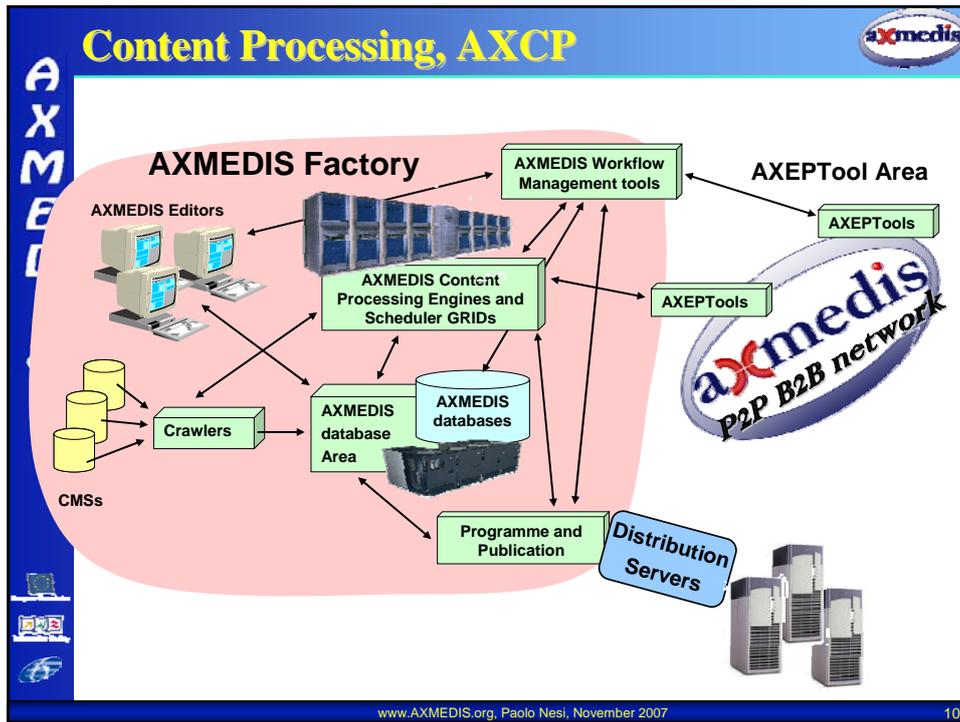
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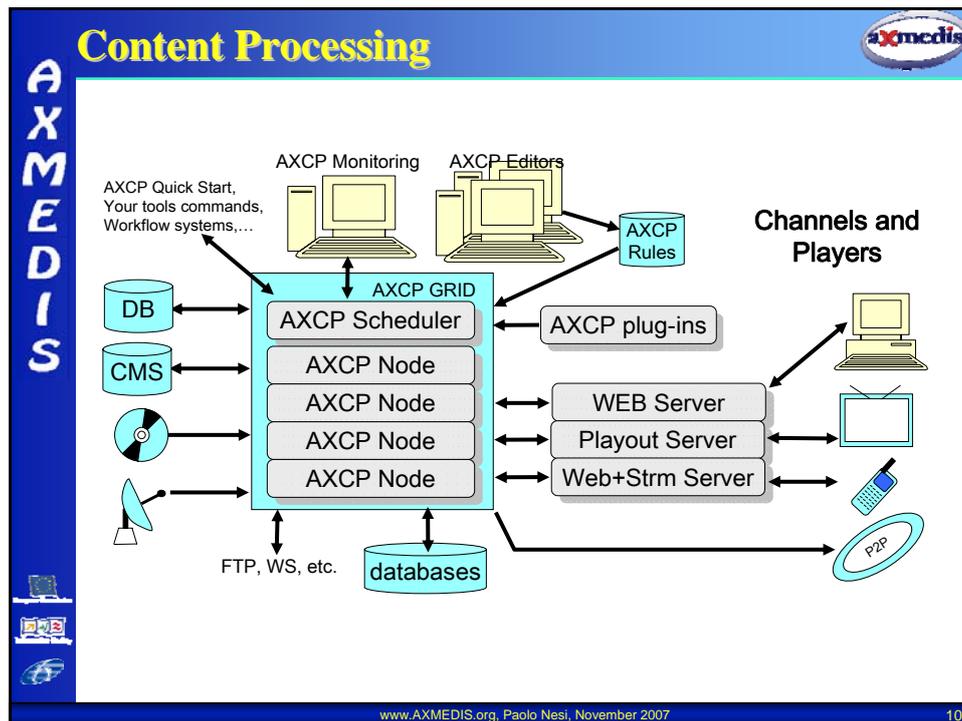
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Content Processing Applications

- ◆ **Automating back office content production/protection and distribution**
 - ◆ Open and secure architecture for content production, processing, protection and enrichment, based on a scalable GRID model
 - ◆ Maximum flexibility with
 - AXMEDIS content processing GRID Language
 - Uses plugins for content adaptation/transcoding for multi-channel production, fingerprinting, processing profiles, etc.
 - Algorithms for automated formatting of content: SMIL, style, Genetic Algorithms
- ◆ **Automating massive processing applications**
 - ◆ For solving the on-demand problem:
 - Production
 - Adaptation, transcoding, processing,
 - Advertisement insertion
 - Managing profiling (user device, network, etc.), etc.
 - ◆ Multi-channel distribution:
 - multiple interoperable DRMs, license chain processing/reasoning
 - ◆ Content recognition for monitoring
 - broadcast and networks,
 - P2P, Web sites, etc.

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- ## AXMEDIS Content Processing Platform
- **AXCP GRID solution allows automated management of:**
 - ◆ content, metadata and licensing information, etc.,
 - **operations of**
 - ◆ ingestion, crawling, database management, indexing, processing, adaptation, transcoding, encoding, decoding, descriptor extractor, recognition, filtering, production, archiving, storing, packaging, preview, extracting fingerprint, licensing, DRM, profiling, protection, encryption, accounting, enrichment, network management, etc.
 - **AXCP tools can be integrated and controlled by your applications and/or workflow management systems.**
 - **AXMEDIS allows you to reduce costs and increase efficiency of your content management.**
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AXMEDIS Content Processing Platform

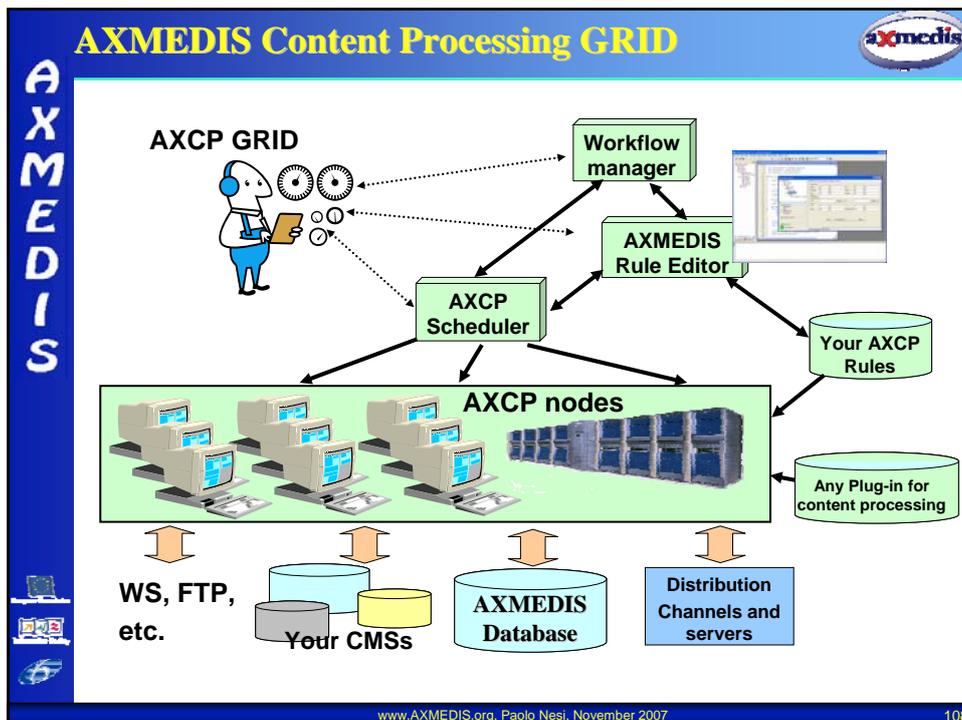
- **AXMEDIS supports the whole value chain and makes real and simple the convergence of media,**
 - ◆ media transcoding,
 - ◆ interoperability of content enabling multi-channel distribution (e.g., mobile, satellite, kiosk, iTV, web, P2P, interactivity, etc),
 - ◆ provides a flexible and interoperable DRM, for both B2B and B2C across traditional and P2P distribution platforms.

- **AXCP solution is based**
 - ◆ AXCP Rules formalized in JavaScript and XML to define jobs, processes and their features (deadlines, needs, etc.).

- **The AXCP tools are based on a Service Oriented Architecture (SOA);**
 - ◆ fully documented APIs for all the JavaScript functionalities, and WEB Services for accessing and controlling tools, and for distributing produced content towards your front-end distribution servers.

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Enabling massive content production and processing

- **AXMEDIS GRID language and tools for**
 - ◆ Automated Content Ingestion and Gathering
 - ◆ Automated Content Query and Retrieval
 - ◆ Automated Content Load and Storage: databases and files

 - ◆ Automated Content and Metadata Processing, enrichment
 - ◆ Automated Content and Data processing
 - ◆ Automated Content Filtering and Repurposing
 - ◆ Automated Content Composition, Formatting
 - ◆ Automated Content Protection and Licensing

 - ◆ Automated Content Publication/Download on/from:
 - ➔ Any channel including P2P Network
 - ◆ Automated Content Distribution
 - ◆ Automated Profiles management and processing
 - ◆ Automated Production of Content on Demand

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AXMEDIS Content Processing capabilities

- **In AXCP Scripts you can manipulate, produce, adapt, extract, manage and process:**
 - ◆ Any type of resource in any format
 - ➔ AXMEDIS/MPEG-21 Objects, IMS, SCORM, OMA objects, and features
 - ◆ Digital resources in any format
 - ◆ Production of new objects: composition, etc.
 - ◆ Formatting, automatically producing/selecting: SMIL, XSLT, etc.
 - ◆ Digital resource adaptation, transcoding,
 - ◆ Extraction of descriptors and fingerprints
 - ◆ Synchronization of media, etc.
 - ◆ Metadata processing, adaptation, and mapping
 - ◆ production and posting of licenses/PAR in OMA and MPEG-21
 - ◆ Verification of Licenses against them and PAR
 - ◆ Protection Information, OMA and MPEG-21 IPMP
 - ◆ Profiling for devices and network capabilities,
 - ◆ Reasoning on device capabilities and user preferences
 - ◆ User Profile and preferences
 - ◆ Etc.
- **Open to any other module with plug-in technology:**
 - ◆ Burning
 - ◆ Etc.

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AXMEDIS CP GRID tools

- **AXCP Rules can be:**
 - ◆ activated for content processing on any AXCP Node as well as on a single computer
 - ◆ used/parameterized to produce content on demand or to be integrated in your content factory
 - ◆ activated from your Workflow Management System or from any other application
 - ◆ activated by changes in remote objects and queries in the local database and on the P2P network.
- **AXCP Nodes allow to be controlled by an AXCP Scheduler. The stand alone version of the AXCP Node can be used for executing AXCP Rules for ad-hoc processing and activation without demanding their allocation and scheduling to the AXCP Scheduler.**
- **AXCP Scheduler to allocate and manage AXCP Rules on Nodes:**
 - ◆ scheduling and balancing jobs/processes on AXCP Nodes
 - ◆ activating jobs as sporadic and periodic tasks
 - ◆ monitoring progress of production processes and their status, etc.
- **AXCP Rule Editor allows you to produce, debug, test and validate AXCP Rules to execute them on AXCP Nodes**
- **AXCP Quick Start allows you to activate Rules in simple manner by passing them parameters;**




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AXMEDIS Considerations

- **AXMEDIS Content Processing allows you to automate any kind of content processing:**
 - ◆ Massive or small scale processing
 - ◆ Locally performed or Workflow controlled
 - ◆ On any kind of Digital Resource not only AXMEDIS objects
- **AXCP Applications for massive processing as**
 - ◆ Production/packaging platform for producers and integrators
 - Digital files, metadata, etc.
 - ◆ Protection of objects, and protection information processing
 - ◆ Transcoding/adaptation platform for distributors
 - ◆ License Production, or as License Sever/processor
 - ◆ etc.
- **Any other question/issue ??**






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- **AXMEDIS Application Scenarios** 
- ◆ Application Scenarios
- ◆ Content Sharing and/or Distribution
- ◆ AXMEDIS Trials and Demonstrators
- Conclusions and references




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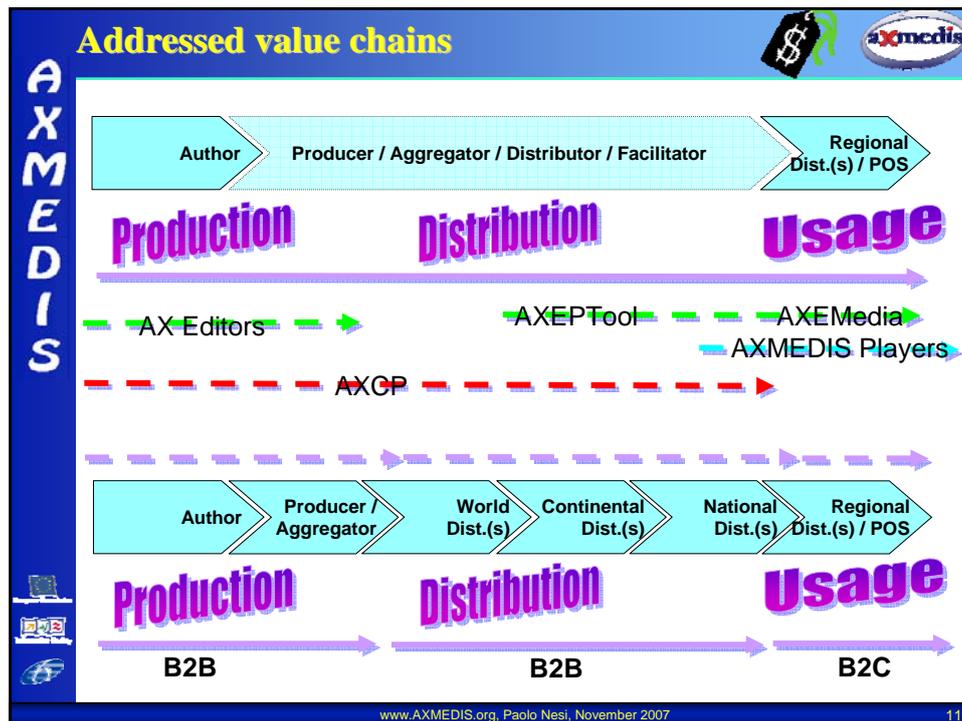
Applicative Areas

- Multi-channel production and distribution: broadcasting, IP/Internet, WEB sites, P2P, mobile, PDA, IPTV, interactive TV and channels, etc.
- Multi-channel experience for customers
- Video on Demand (VOD), and production on demand solutions
- Control of P2P content sharing and distribution, involving your customers in distribution (super-distribution)
- Involve customers and final users in content production and social networking
- interoperable DRM (MPEG-21, OMA, etc.)
- different business models and/or transactions on the same distribution channels: pay per play, monthly rate, preview, renting, advertising, etc.
- interactivity with cross media models
- advertising (customized and/or real time personalized advertising)
- Production and distribution of content with unprotected preview and the rest protected
- Etc.




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- ### Applications and scenarios
-
- The slide lists various applications and scenarios for AXMEDIS, categorized into two main groups: 'In most of the cases there is:' and 'In some cases there is the usage of:'.
- AXMEDIS**
- **In most of the cases there is:**
 - ◆ Usage of the AXMEDIS Editors and Players
 - ◆ Massive usage of the AXCP GRID for managing back office issues, defining specific scripts for:
 - Automated content production and adaptation (MPEG-21, OMA, etc.)
 - Automated creation of licenses (MPEG-21, OMA, etc.)
 - Automated regeneration of new versions of the objects
 - Automated object acquisition and posting on DataBases
 - ◆ Support of the AXMEDIS PMS and AXCS for the DRM aspects
 - ◆ Support of the CAMART and All for collecting reporting data
 - ◆ Usage of the AXMEDIS Editors and Players
 - ◆ Front ends for selling and distributing of the Distributors involved so that to maintain their plate and relationships with their customers
 - **In some cases there is the usage of:**
 - ◆ The P2P tools, for B2B and B2C2C
 - ◆ Some specific tools for content posting on the databases
 - ◆ Some specific player tools for final users
 - ◆ Some specific tools for Home and Factory Domain Management
 - ◆ Workflow support
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AXMEDIS



Enabling secure/legal P2P

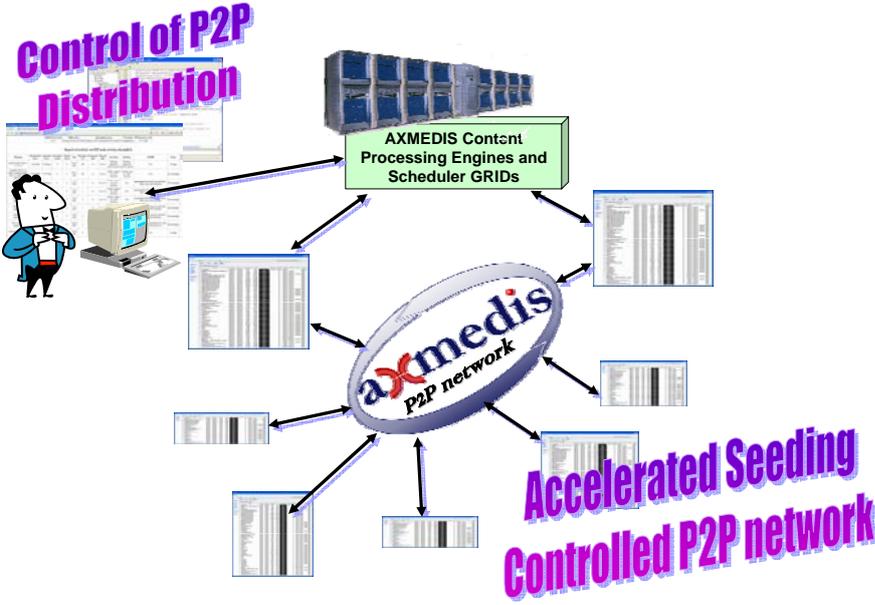
- **P2P network set up for content distribution**
 - ◆ BitTorrent Technology with Query and Catalogue
 - ◆ Protected content, legal P2P set up
 - ◆ P2P Client Tools
 - ◆ Automated B2B content distribution/publication via P2P, fast seeding,
 - ◆ Automated and efficient control of P2P networks
 - ◆ CONSUMER content distribution and sharing

- **Content Sharing among, producers, integrators, archives and libraries, etc.**

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Controlled P2P Network



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AXMEDIS P2P Tools

- **AXMEDIS P2P tools for content sharing respecting IPR**
 - ◆ Content Distribution and P2P file sharing based on BitTorrent
 - ◆ DRM support, supervision and control
 - ◆ Certified metadata, etc.

- **AXEPTool**
 - ◆ Only for B2B
 - ◆ Technical queries and information:
 - ➔ Features, descriptors, duration, formats, license information, distribution model, etc.
 - ◆ Automated loading and publication via the AXCP tools
 - ◆ Control and certification of metadata

- **AXMEDIA tool:**
 - ◆ Only for C2C and B2C
 - ◆ Simple queries on simple user focussed metadata
 - ◆ Simple management of files on the file system
 - ◆ Control and certification of metadata

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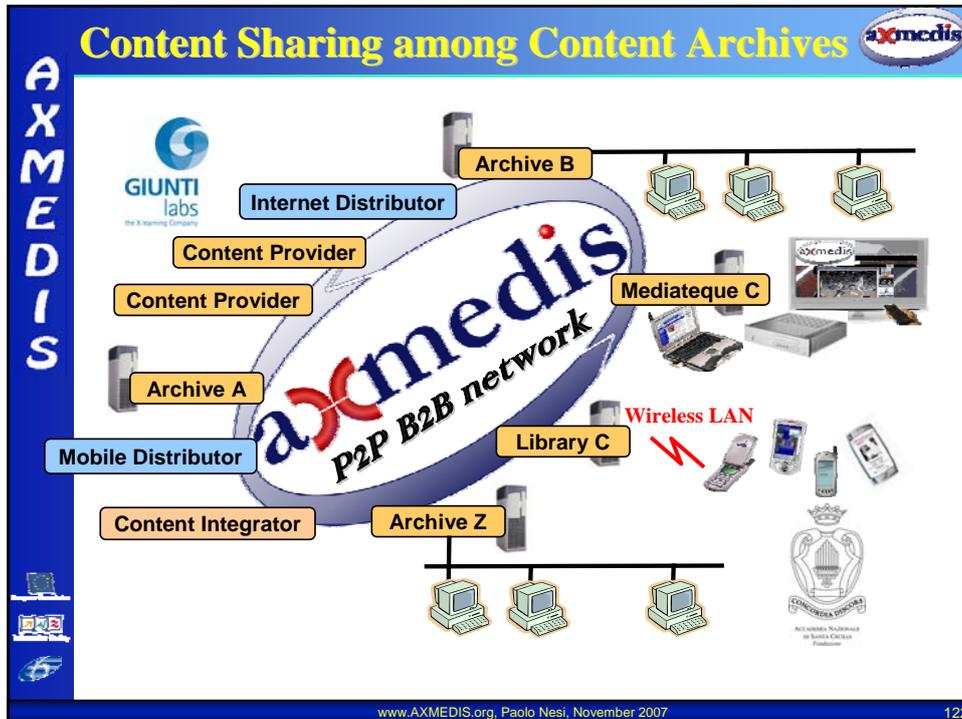
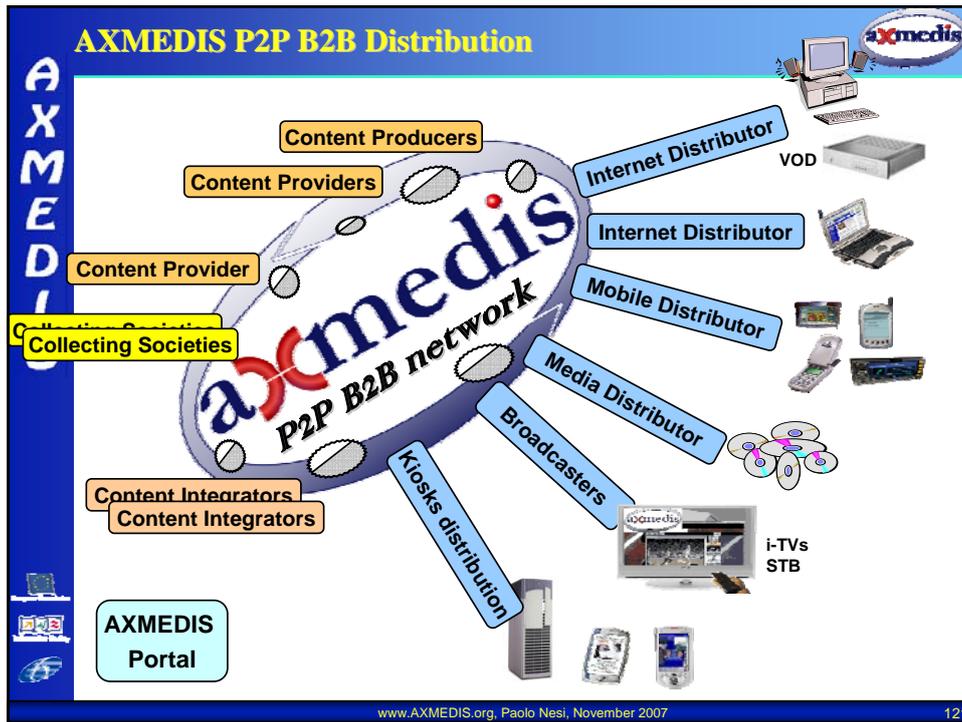
AXMEDIS P2P for B2B: AXEPTool

ID	Name	Size	Date	Status
1	FC 4-086 DVD.iso	256,12 MB	3,89 GB	100.00%
54	AXMEDIS DVD Tests Docs Examples Fatorale March 2002...	1,61 MB	4,31 GB	100.00%
52	honeydip	103,06 KB	60,36 KB	100.00%
51	Audio-Collection_Audio	18,87 MB	18,87 MB	100.00%
50	AXEPTool User Manual and Installation Guide v1.1.pdf	902,15 KB	902,15 KB	100.00%
49	AXEPTool User Manual and Installation Guide v1.1.rar	1,42 MB	1,42 MB	100.00%
48	axmedis 2006 general tutorial part 1.mpg	363,37 MB	363,37 MB	100.00%
47	AXMEDIS 2006 General tutorial part 1.mpg	445,46 MB	445,46 MB	100.00%
46	AXMEDIS 2006 General tutorial part 3.mpg	336,19 MB	336,19 MB	100.00%
45	axmedis 2006 general tutorial part 3.mpg	267,77 MB	267,77 MB	100.00%
44	axmedis 2006 general tutorial part 4.mpg	454,05 MB	454,05 MB	100.00%
43	axmedis 2006 general tutorial part 4.mpg	459,89 MB	459,89 MB	100.00%
42	AXMEDIS 2006 General tutorial part 4.mpg	5,24 MB	5,24 MB	100.00%
41	AXMEDIS Framework and Tools_Learn	31,99 MB	31,99 MB	100.00%
40	AXMEDIS Specifications 2006_Learn	12,51 MB	12,51 MB	100.00%
39	chiralis2.Learn	1,89 MB	1,89 MB	100.00%
38	Flash example 2 AXMEDIS MWDS.Learn	1,67 MB	1,67 MB	100.00%
37	Flash example 1.Learn	26,54 MB	26,54 MB	100.00%
36	happy birthday send source.zip	26,83 MB	26,83 MB	100.00%
35	happy birthday 02	26,84 MB	26,84 MB	100.00%
34	memorand.Learn	2,67 MB	2,67 MB	100.00%
33	live presentation feb2007 new.ppt	62,29 MB	62,29 MB	100.00%
32	live presentation feb2007 new.pdf	75,32 MB	75,32 MB	100.00%
31	live presentation feb2007 new.ppt	13,64 MB	13,64 MB	100.00%
30	AXMEDIS Global Lessons_Learn	15,52 MB	15,52 MB	100.00%
29	AXMEDIS Plug User Cases Tests 2006.Learn	7,57 MB	7,57 MB	100.00%
28	ax111.Learn	241,79 MB	241,79 MB	100.00%
27	info christmas games.Learn	99,87 KB	99,87 KB	100.00%
26	info.Learn	15,33 KB	15,33 KB	100.00%
25	How to install and configure axmedis.Learn	80,50 KB	80,50 KB	100.00%
24	chiralis 0.2.mpg1	15,32 MB	15,32 MB	100.00%
23	chiralis.Learn	15,32 MB	15,32 MB	100.00%
22	karaoke.Learn	15,32 MB	15,32 MB	100.00%
21	memorand 0.Learn	15,32 MB	15,32 MB	100.00%
20	info.Learn	15,32 MB	15,32 MB	100.00%
19	Audio-Collection_Audio	18,87 MB	18,87 MB	100.00%
18	memorand.Learn	15,32 MB	15,32 MB	100.00%
17	mp3 test 4.Learn	450,82 KB	450,82 KB	100.00%
16	ax111_HelloWorld.Learn	15,32 MB	15,32 MB	100.00%
15	AXMEDIS Development status Profile.Learn	15,32 MB	15,32 MB	100.00%
14	info.Learn	15,32 MB	15,32 MB	100.00%
13	114.Learn	15,32 MB	15,32 MB	100.00%
12	demo_chiralis.Learn	15,32 MB	15,32 MB	100.00%
11	chiralis.Learn	15,32 MB	15,32 MB	100.00%
10	chiralis.Learn	15,32 MB	15,32 MB	100.00%
9	chiralis.Learn	15,32 MB	15,32 MB	100.00%
8	chiralis.Learn	15,32 MB	15,32 MB	100.00%
7	chiralis.Learn	15,32 MB	15,32 MB	100.00%
6	chiralis.Learn	15,32 MB	15,32 MB	100.00%
5	AXMEDIS 0.6.0-1.1 AXMEDIS	3,46 KB	3,46 KB	100.00%
4	mp3 example.Learn	15,32 MB	15,32 MB	100.00%
3	axmedis example tests full version	527,79 MB	527,79 MB	100.00%
2	axmedis p2p setup v3.2 0.Learn	15,32 MB	15,32 MB	100.00%
1	axmedis p2p setup v3.2 0.Learn	297,81 MB	297,81 MB	100.00%

Enhanced BitTorrent Technology
 with AXEPTool P2P B2B tool

www.AXMEDIS.org, Paolo Nesi, November 2007

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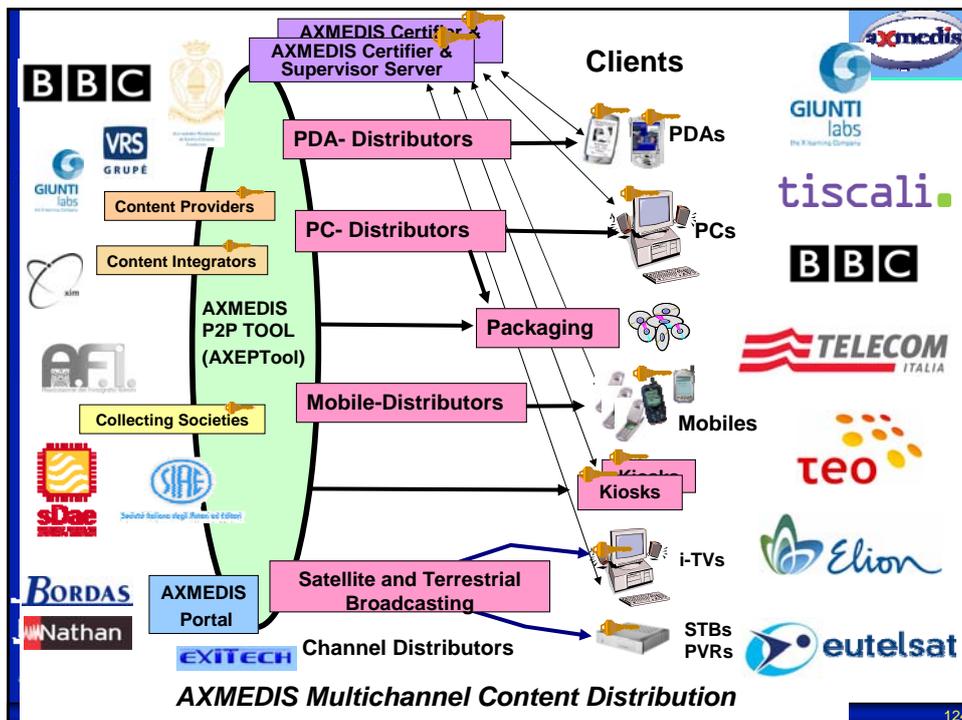
AXMEDIS Multichannel Distribution

AXMEDIS



- **PCs via Internet+P2P, AXMEDIS P2P and PC player:** TISCALI Media Club, DSI 
- **PCs via Internet, AXMEDIS PC player:**
 - ◆ ELION, VRS 
- **PCs via Satellite data broadcast, AXMEDIS PC player:**
 - ◆ EUTELSAT, UNIVLEEDS 
- **PDA via Kiosks, AXMEDIS PDA player:**
 - ◆ ILABS + ANSC Kiosks, TISCALI, DSI  
- **STBs and PVRs:**
 - ◆ AXMEDIS STB: IPTV, Internet VOD: TEO, VRS 
 - ◆ AXMEDIS STB/PVRs via Satellite data broadcast: EUTELSAT, MBI 
- **Mobiles:**
 - ◆ AXMEDIS mobile player: ILABS, TISCALI, DSI  
 - ◆ OMA player: Telecom Italia (TI), DSI 
- **PCs via Internet+P2P, AXMEDIS P2P and PC player:**
 - ◆ free air DVB-T + home domains/media center
 - ◆ BBC, SDAE, ETRI, UPC  

www.AXMEDIS.org, Paolo Nesi, November 2007 123



TISCALI Distribution with AXMEDIS Technology




AXMEDIS

- **B2C distribution**
- **AXMEDIS objects with**
 - ◆ Video and Audio Files, with MD, images and also MPEG-4
- **The AXMEDIS Objects may be**
 - ◆ Downloaded from the TISCALI media club or P2P AXMEDIA
 - ◆ shared among consumers with AXMEDIA Tool a P2P tool
 - ◆ Visualized and played on AXMEDIS players free accessible
- **The users**
 - ◆ have to perform the registration on TISCALI
 - ◆ by a license to use the content
 - ◆ may use any AXMEDIS player
 - ◆ Mainly on PCs and Media Centers. PVRs
- **License allows**
 - ◆ Content sharing on AXMEDIA
 - ◆ Content play
 - ◆ Content Adaptation...
 - ◆ Content Migration on other P2P channels...
 - ◆ Content Migration on any other AXMEDIS terminal



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TISCALI Media Club, Distribution Portal




AXMEDIS

mediacubmanager

- Search Axmedis media
- Media catalog
- Statistics

Search for:

Search for:

right

territory

exercise limit

validity interval

2 records found Page 1

title	type	creator	date	import status
Ariete	NULL	NULL	12/09/2007	<input type="button" value=""/>

Statistics

Search: from: media id:

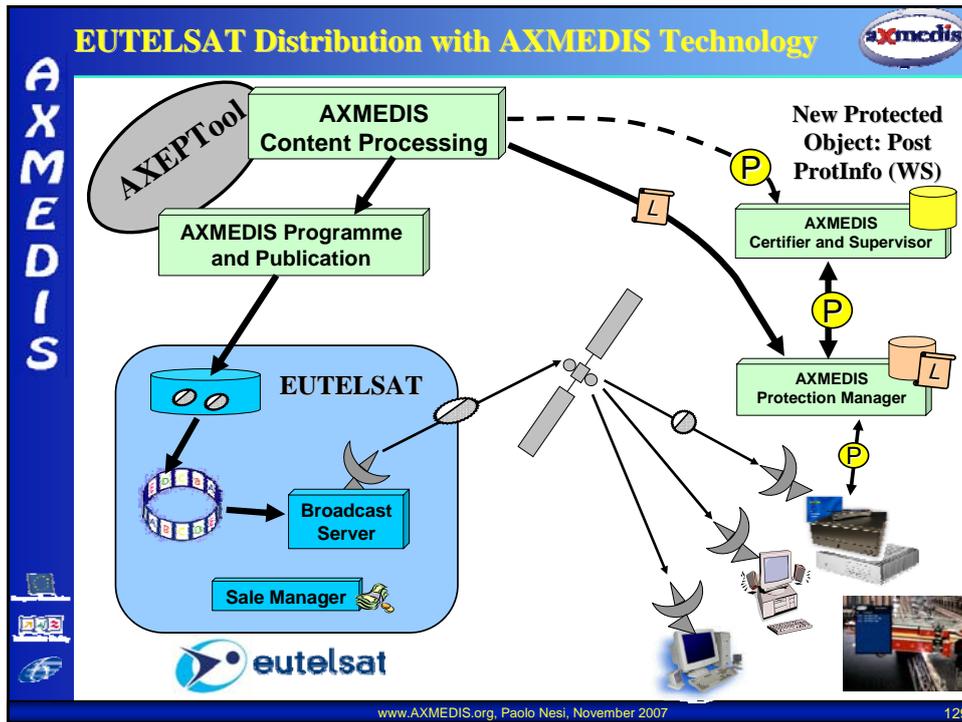
creator: domain: work identification:

1844 records found Page 1

media id	creator	operation	execution	regi
<input type="button" value=""/> URN:AXMEDIS:00002:OBJ:09909E67-1D09-3709-9487-115183071319	URN:AXMEDIS:00002:BUS:0D998006-6E93-3ECC-ABC4-8B2122A0654C	mxplay	2007-10-16 10:50:02	2007-10-49
<input type="button" value=""/> URN:AXMEDIS:00002:OBJ:7362A059-8481-31A1-0B51-09C73ED1E3F3	URN:AXMEDIS:00002:BUS:7C88E82E-6040-3E80-8476-9C2806DDE43D	mxplay	2007-10-16 09:24:19	2007-09:24
<input type="button" value=""/> URN:AXMEDIS:00002:OBJ:8A795BCC-34DB-3D29-B26A-44EF6CFD9B51	URN:AXMEDIS:00002:BUS:0D998006-6E93-3ECC-ABC4-8B2122A0654C	mxplay	2007-10-16 08:43:19	2007-08:43
<input type="button" value=""/> URN:AXMEDIS:00002:OBJ:6905BACD-668F-376D-BC58-878F152AAAF7	URN:AXMEDIS:00002:BUS:D6D45C62-802F-3AC2-99AF-EF8097C784A4	mxplay	2007-10-15 17:36:14	2007-17:37

www.AXMEDIS.org, Paolo Nesi, November 2007

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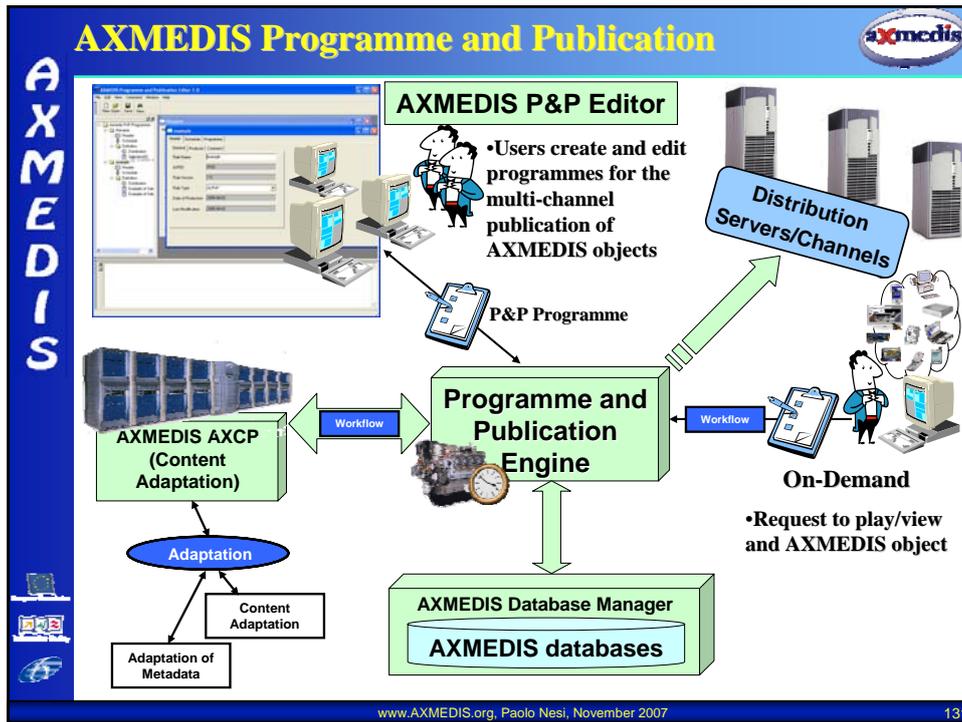


EUTELSAT Distribution with AXMEDIS Technology

- AXMEDIS Service on ATLANTIC BIRD™ 1:
 - ➔ 12.5° West, covering Europe and Americas
 - ➔ Frequency: 11.428GHz
 - ➔ Symbol rate: 30000KSym/s
 - ➔ Polarization: Horizontal

<http://www.eutelsat.com/satellites/125e.html>

www.AXMEDIS.org, Paolo Nesi, November 2007



VIDEO on EUTELSAT distribution

see links in the last page to download the videos

Name	Start Time	Duration	Size	Speed	Target
Tizi	16:12	3s	205 KB	64 KB/s	📶
Le...ao	16:12	2s	159 KB	64 KB/s	📶
oses-game-flash...	16:13	8s	543 KB	64 KB/s	📶
Mandolino	16:13	1m 6s	4.16 MB	64 KB/s	📶
Miracle Maker	16:15	< 1s	58.2 KB	64 KB/s	📶
theCrossing	16:15	1m 32s	5.76 MB	64 KB/s	📶
Little Vampire Inter...	16:17	42s	2.68 MB	64 KB/s	📶
sport1	16:18	2m 40s	10 MB	64 KB/s	📶
sport2	16:22	2m 40s	10 MB	64 KB/s	📶

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EUTELSAT Distribution with AXMEDIS technology

- **B2B and B2C distribution**
- **AXMEDIS objects with**
 - ◆ Any kind of content,...
 - ◆ Video, images, document, audio, animations, etc.
- **The AXMEDIS Objects may be**
 - ◆ Visualized and played on AXMEDIS players free downloaded
- **The users have to perform the registration of**
 - ◆ themselves on an AXMEDIS portal or via the STB ID/PIN
 - ◆ any AXMEDIS player tool they would use
 - ◆ Mainly on PC for TV and/or STB and/or Kiosks
- **License allows**
 - ◆ Content play
 - ◆ Content Adaptation...
 - ◆ Content Migration on any other AXMEDIS terminal, in some cases

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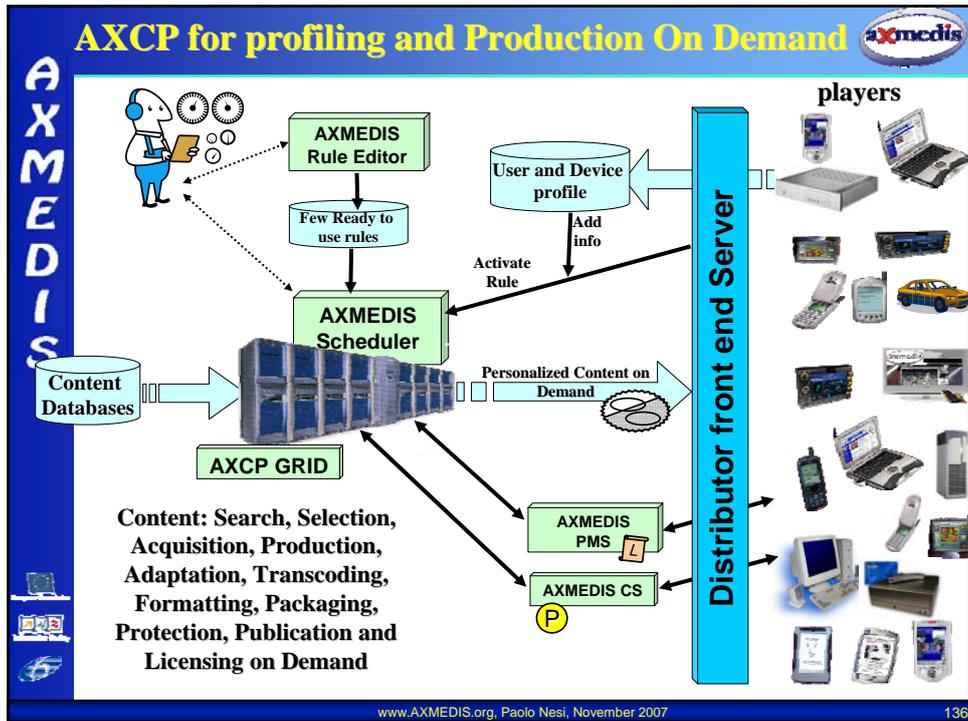
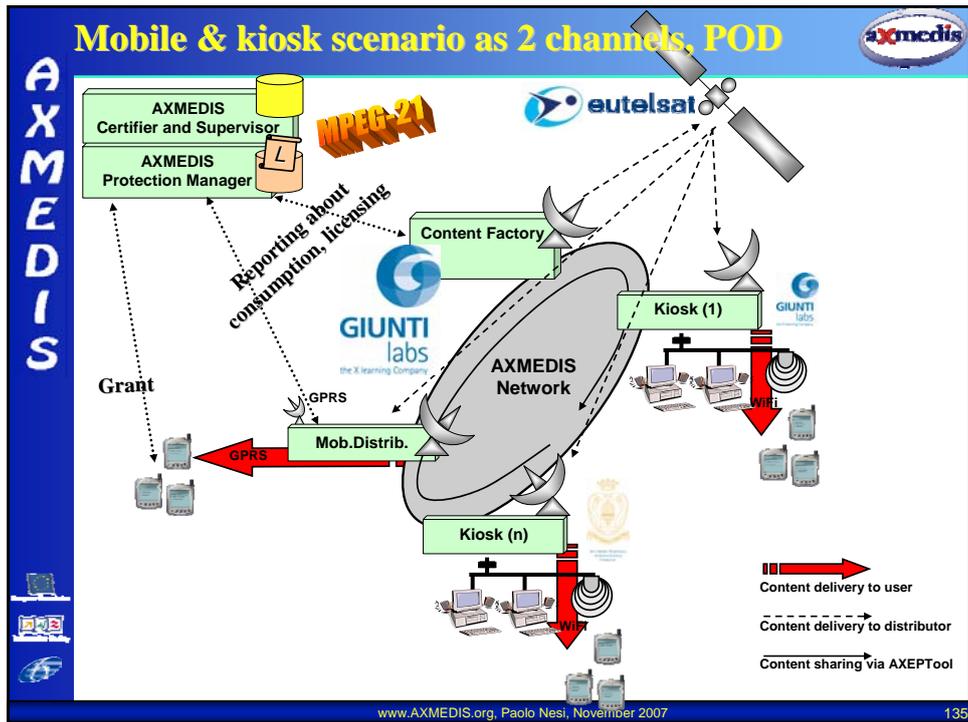
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ILABS Distribution with AXMEDIS technology

- **B2B and B2C distribution**
- **AXMEDIS objects with**
 - ◆ Educational and cultural content,...
 - ◆ Video, images, document, audio, animations, etc.
- **The AXMEDIS Objects may be**
 - ◆ Produced on demand on the basis of phone profile, POD
 - ◆ Visualized and played on AXMEDIS players free downloaded
- **The users have to perform the registration of**
 - ◆ themselves on ILABS portal and/or an AXMEDIS portal
 - ◆ any AXMEDIS player tool they would use
 - ◆ Mainly on PC-Kiosks, PDA and/or mobiles
- **License allows**
 - ◆ Content play
 - ◆ Content Adaptation...
 - ◆ Content Migration on any other AXMEDIS terminal, in some cases

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ILABS Content Distribution to Kiosks and PDA



KIOSKFACTORY

Catalogue Creation Workflow management Camart Home Back

Catalogue Creation

Fields marked by * are mandatory.

*Filename: cat.xml
 *Identifier: cat
 Description:
 Template:
 *Validity start: 2007-03-09
 *Validity:



Field

Contributor

Contributor

[Welcome admin](#) [Home](#) [Catalogue](#) [Admin](#) [Back](#) [Logout](#)

Username	Last Name	First Name	(0)	Roles	Modify	Remove
a1	a1	a1				
a22	a22	a22				
admin	Cognome	nome				
my	Cognome	nome				
john	Smith	John				

Username Last Name First Name (0) Roles Modify Remove

[Change language](#)



GIUNTI
labs
the X learning Company



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AXMEDIS distribution on IPTV, VOD on STB



AXMEDIS
P2P B2B network



Cross media Content, from video, audio to complex content

Audio and Video Distributor

TEO Video on Demand Front End Server

VOD access service

issue license

Accounting and reporting

AXMEDIS Certifier and Supervisor

AXMEDIS Protection Manager

AXMEDIS DRM






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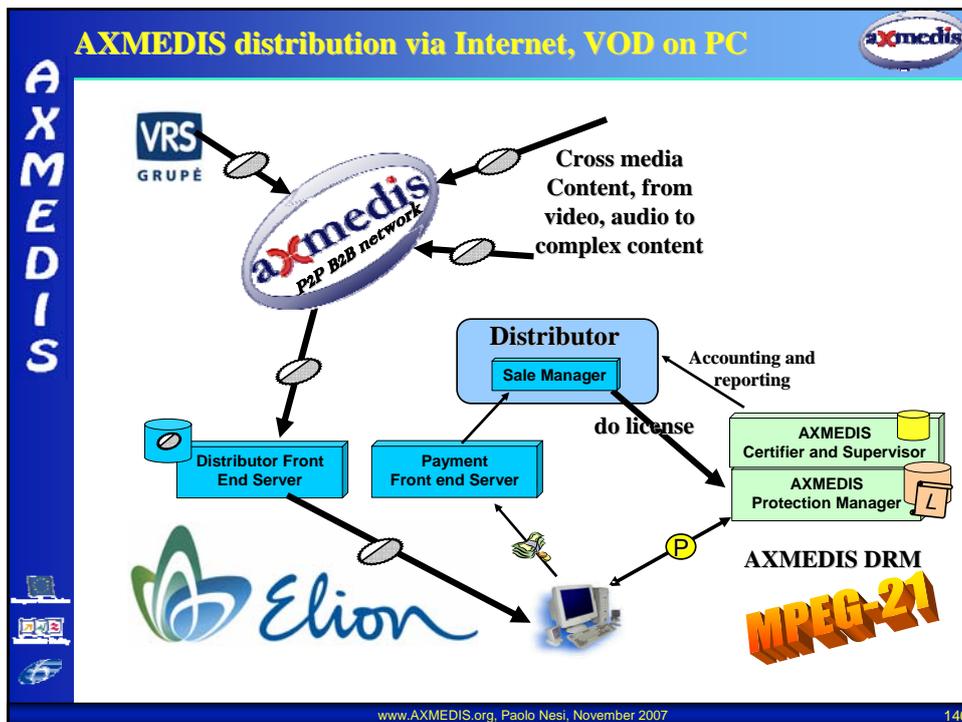
VIDEO on TEO VOD channel

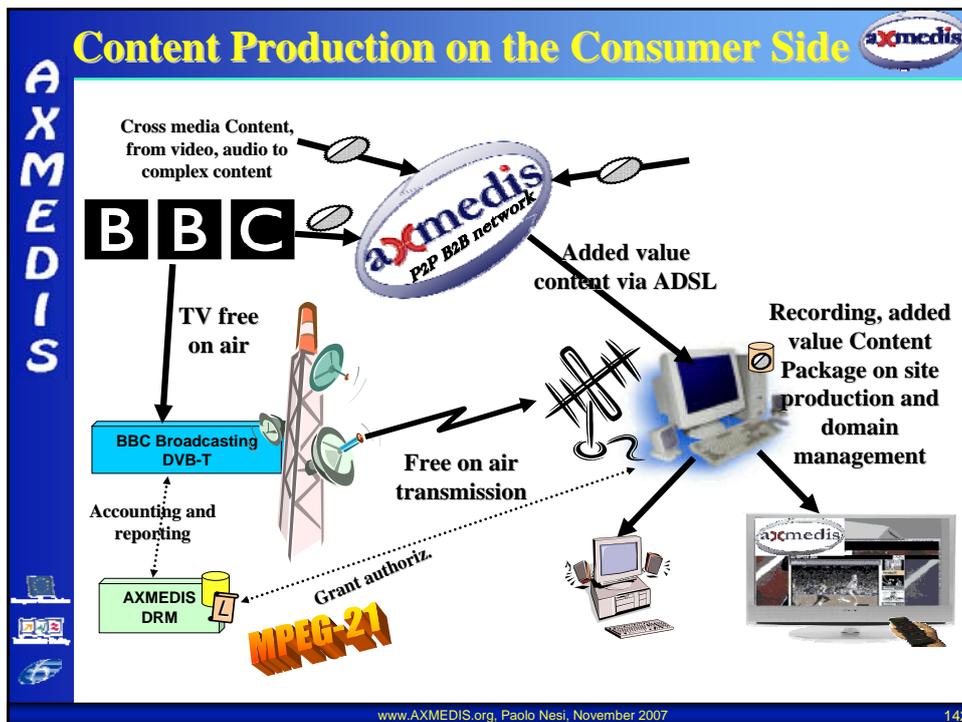
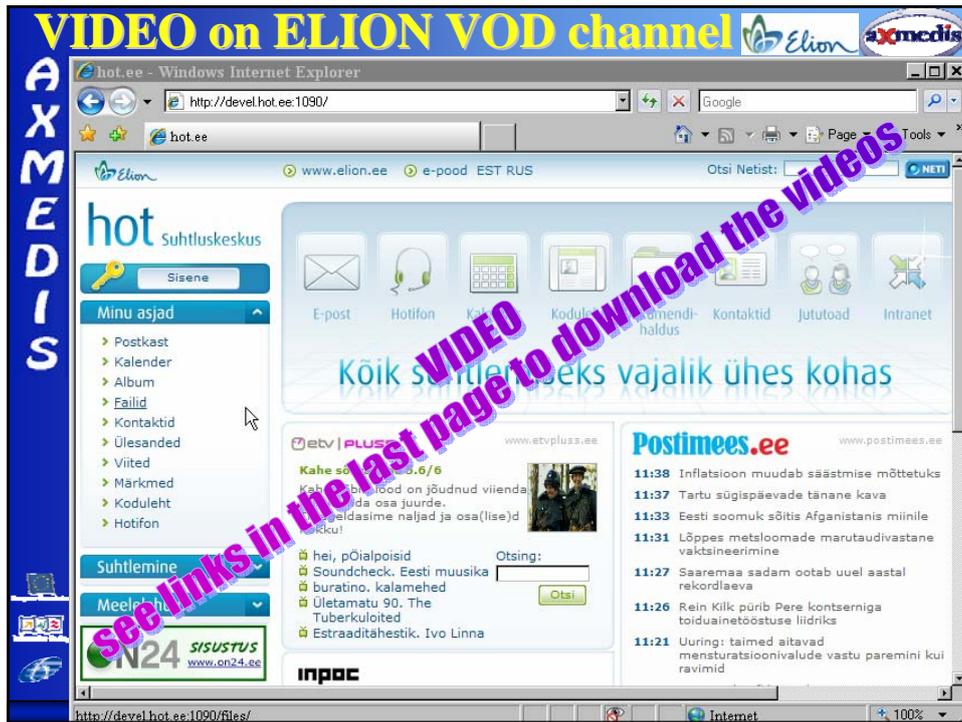
AXMEDIS

see links in the last page to download the videos

TEO axmedis

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VIDEO on BBC content production

VIDEO
 see links in the last page to download the videos

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Interoperability among channels

- Channels are the distribution methods for content:**

 - ◆ Streaming, e.g., DVB-T, S, H
 - ◆ Downloading, WEB

DVB-T
P2P
Internet
- Channels are grounded on different communication standards,**

 - ◆ MPEG, HTTP, RTSP, DVB, etc.
 - ◆ Content and devices are strongly related to the supported input channel

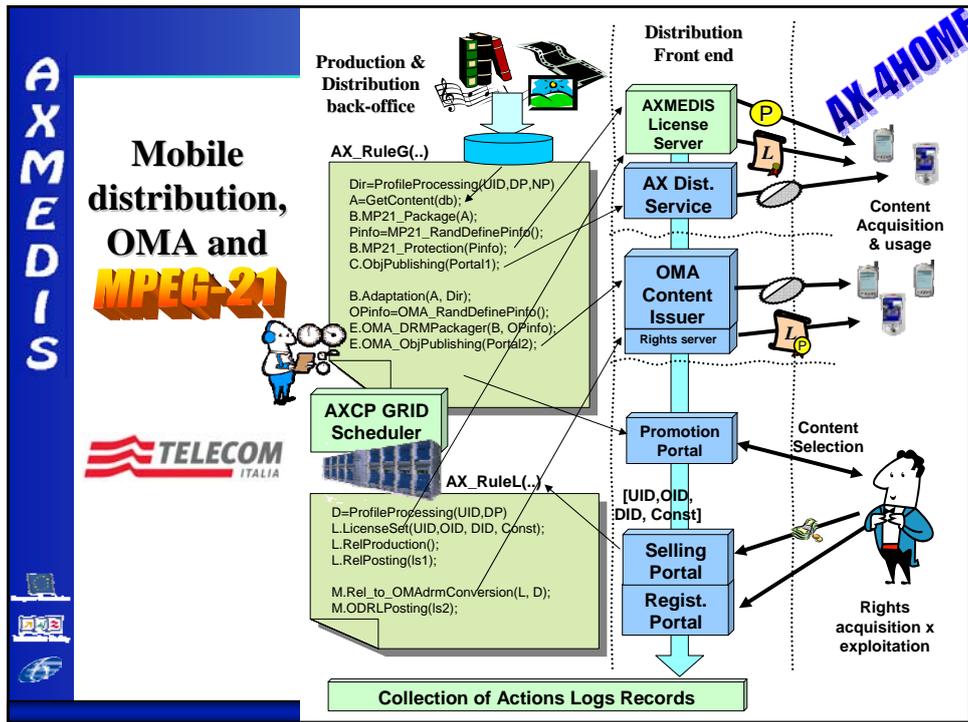
UMTS
GPRS
DVB-S
- AXMEDIS content is independent on the communication channel**

 - ◆ Content can be automatically produced for multiple channels at the same time
 - ◆ Content received from one channel can be passed to a different one

Downloading
Streaming
VOD
P2P

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Telecom Italia, OMA & MPEG-21 distribution

AXMEDIS Rule Editor

```

Function adapt(Audio(audio), mimeType)
32
33
34 print("Content adapted audio");
35
36 var resource = audio.getContest();
37 var s = ();
38 for (i in resource)
39 {
40   var res = resource[i];
41   var m;
42   if (res.isAnalyzed() && resource)
43   {
44     var i = resource[i].mimeTypes.search("audio");
45     if (i != -1)
46     {
    
```

AXMEDIS Home Page - Mozilla Firefox

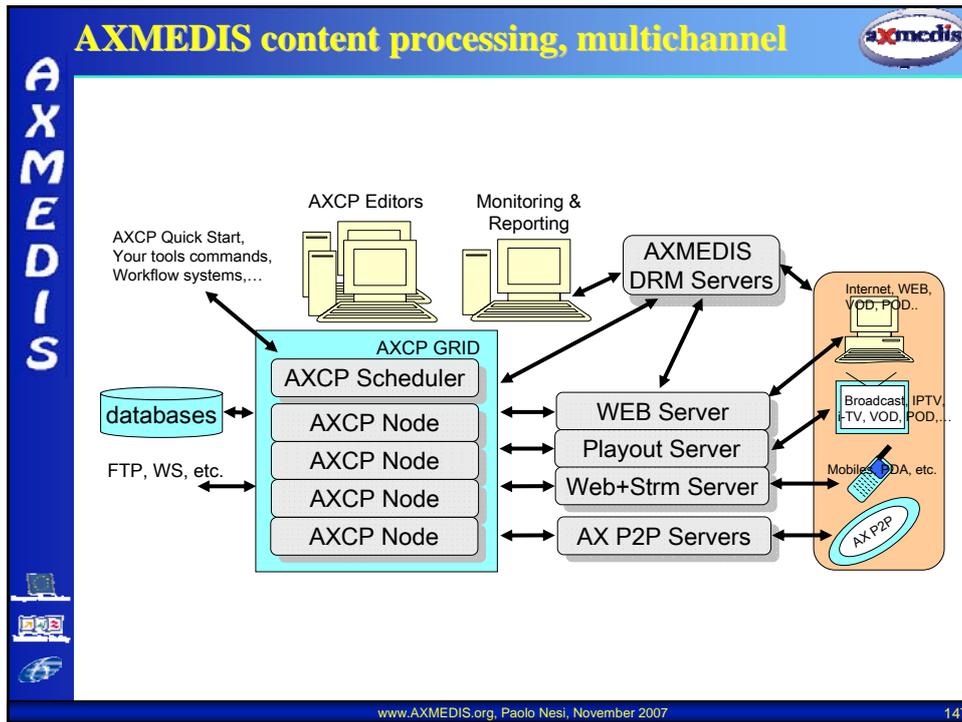
Choose an option:

- View list of Axmedis contents
- Load a new content
- Load a new license

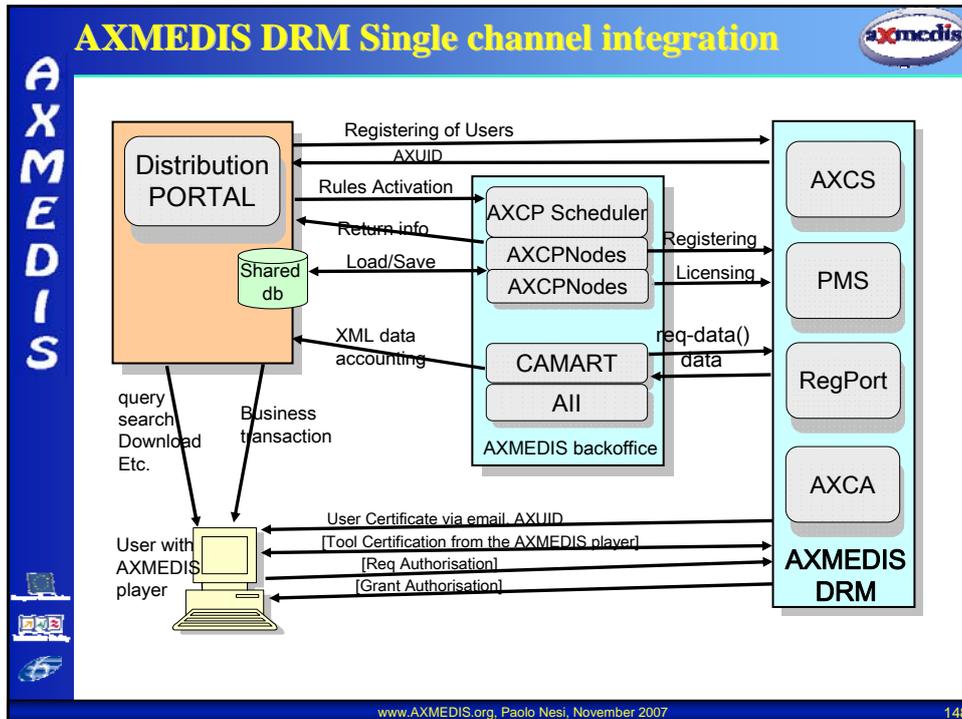
TELECOM ITALIA

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AXMEDIS



USERS production and distribution

- **Content production tools for final users, SIAE trial**

- **Set up a service for final users', producers**
 - ◆ content acquisition and collection from the final user would,
 - ➔ Definition of the DRM rules from the final users
 - ◆ automated content production, protection and adaptation
 - ◆ automated license creation
 - ◆ License production on demand, different models
 - ◆ Content distribution via distribution portal with/without DRM



Società Italiana degli Autori ed Editori

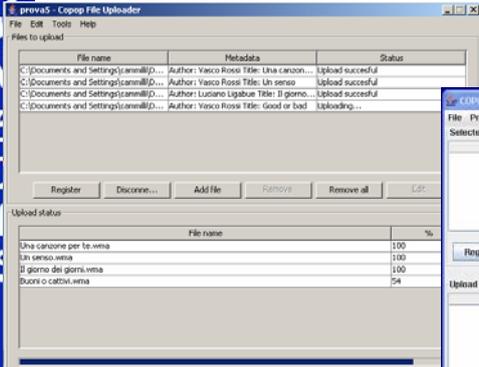
www.AXMEDIS.org, Paolo Nesi, November 2007

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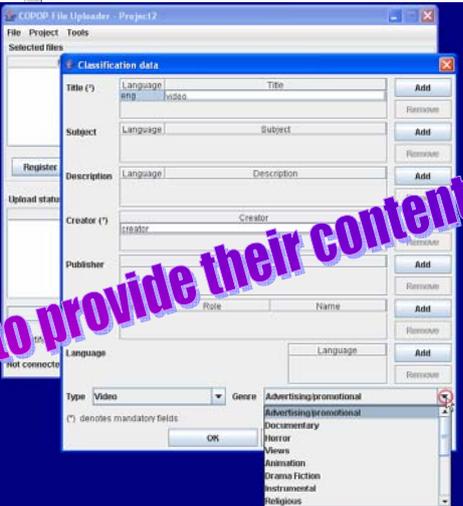
AXMEDIS



AXMEDIS Content Posting Portal, SIAE



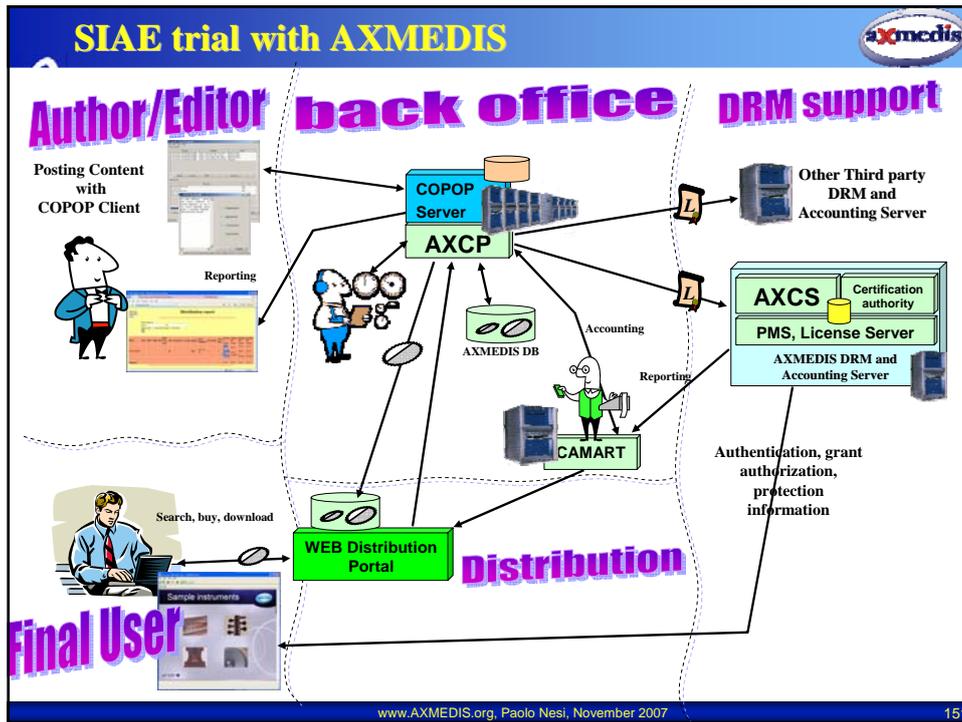
File name	Metadata	Status
C:\Documents and Settings\jammal\p...	Author: Vasco Rossi Title: Una canzon...	Upload successful
C:\Documents and Settings\jammal\p...	Author: Vasco Rossi Title: Un senso	Upload successful
C:\Documents and Settings\jammal\p...	Author: Luciano Ligabue Title: Il game...	Upload successful
C:\Documents and Settings\jammal\p...	Author: Vasco Rossi Title: Good or bad	Uploading...



Engage FINAL USERS to provide their content

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Fase 1: file upload with COPOP client

The screenshot shows the "COPOP File Uploader - Project12" window. It features a "Selected files" table with columns for "File name", "Metadata", and "Status". Below the table are buttons for "Register", "Connect", "Add file", "Remove file", and "Remove All". The "Upload status" section shows a progress bar at 0% and a checkbox for certifying rights. The status is "Not connected".

VIDEO
see links in the last page to download the videos

AXMEDIS

www.AXMEDIS.org, Febbraio 2007

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Content Enrichment with final users

- **Content Enrichment with AXMEDIS**
- **VARIAZIONI e-ContentPlus**
- www.variazioni.org
- **Content**
 - ◆ enrichment, several forms
 - ◆ produced and reproduced on demand at each enrichment
 - ◆ production with DRM
 - ◆ distribution from VARIAZIONI portal and from AXMEDIS P2P
- **> than 10 partners + communities**
 - ◆ Partners from Spain, Lithuania, Belgium, Portugal, Italy, Finland, Portugal




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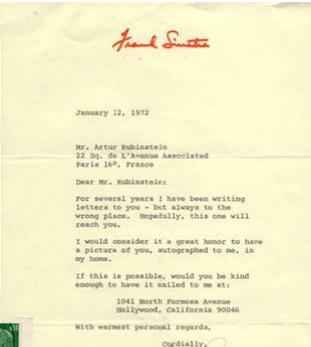
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Content Enrichment and social network

- **audiovisual**
 - ◆ Master classes of famous magisters (Harmos)
 - ◆ Concerts
 - ◆ Conferences
 - ◆ Special Events...
- **audio**
 - ◆ Concerts
 - ◆ Lessons
 - ◆ Rehearsals of concerts
 - ◆ Popular Songs...
- **historic documents**
 - ◆ Programs of concerts
 - ◆ Letters
 - ◆ Scores
 - ◆ Images
 - ◆ Articles
 - ◆ Pedagogical Material

VARIAZIONI





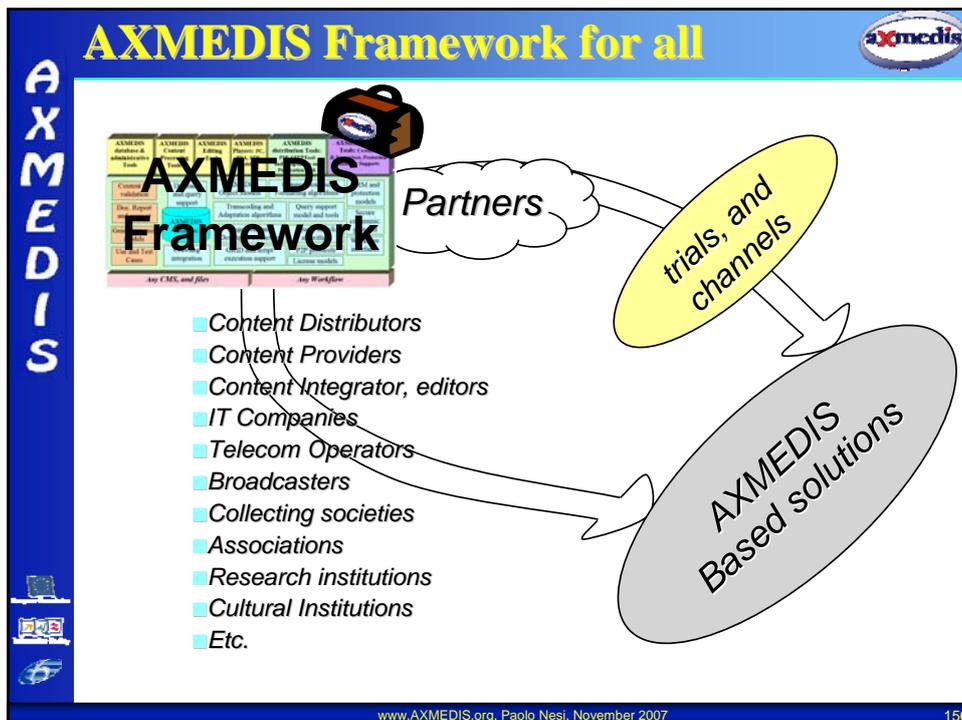

www.AXMEDIS.org, Paolo Nesi, Novemb

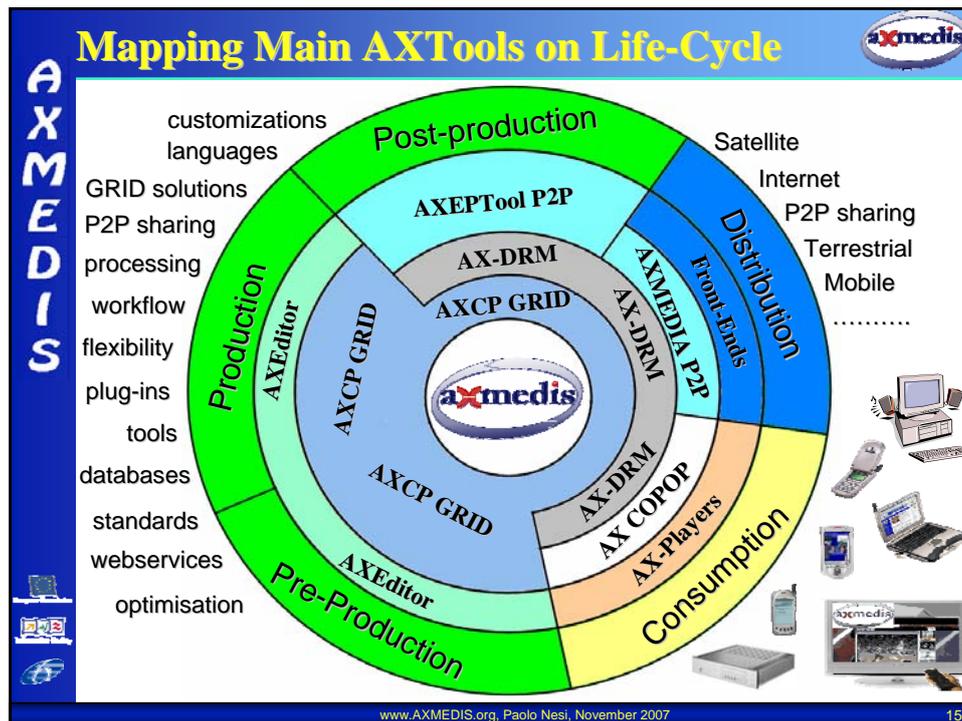
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Table of Content

- Preface
- What is AXMEDIS
- Market Analysis and Opportunities
- State of the Art, Limitations, Needs
- AXMEDIS Content Protection and Tracking
- AXMEDIS Content Production and Packaging
- Examples of AXMEDIS Applications
- **Conclusions and references** ←

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- ### Can be a very important solution to
- **support the distribution of Cross media content**
 - ◆ More interactivity and capabilities for the consumers
 - ◆ Interoperability among devices/content for the consumers
 - ◆ Interoperability among DRM for the consumers and along the value chain
 - **make easier the B2B market of digital content, and of cross media content**
 - ◆ Composition and DRM management
 - ◆ Tracking and monitoring the exploitation of rights
 - ◆ Simpler B2B Content Trading, costs reduction
 - ◆ High flexibility in business and transaction models
 - **make easier for SMEs to access/survive in the digital content market**
 - ◆ Proposed and getting content
 - ◆ Set up distribution and other business solutions for content
- www.AXMEDIS.org, Paolo Nesi, November 2007 158

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AUTOMATING the BACKOFFICE

- **Lower costs of and enabling**
 - ◆ content gathering, transcoding/monitoring platform, production of content on demand with AXCP
 - ◆ integrate cross media content and automatically managing rights for complex multimedia products
 - ◆ production, B2B distribution, promotion via P2P B2B
- **New forms of content and unexploited content:**
 - ◆ Making business with cross media content, integrating HTML, SMIL, document, video, etc., no possible up to now
 - ◆ Exploiting the content "long tail"
- **Interoperability, convergence of media**
 - ◆ interoperability of content and DRM, Multi-channel distribution
 - ◆ access to the same content on several platforms, devices and locations
 - ◆ greater level of security, control of content usage in all channels B2B2C
- **DRM, creation new business models**
 - ◆ different business models on the same channel may be used
 - ◆ adapting the distribution channel to the users needs and would
 - ◆ Access to detailed reporting on the exploited rights
- **Distribute content with**
 - ◆ Any B2C: Internet, STB, broadcasting, Mobile, kiosks, pda, etc.
 - ◆ P2P to Consumers with the support of DRM






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- **A unique framework for all**
 - ◆ *Cross Media Content and tools*
 - ◆ *Backoffice Automation*
 - ◆ *Standards*
 - ◆ *Open platforms*
 - ◆ *Interoperability on content*
 - ◆ *Interoperability on devices/players*
 - ◆ *Interoperability on DRM*
- **The added value to your business!**






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Affiliation to the AXMEDIS

- **The benefits of the affiliation include the possibility of using the AXMEDIS technology and tools (customize them from source code), for your business without limitations**
- **You can become affiliated with AXMEDIS. The affiliation provides access to**
 - ◆ a large amount of information and knowledge
 - ◆ full source code AXMEDIS Framework TOOLS
 - ◆ AXMEDIS tools ready to be used
 - ◆ Technical reports and documentation
 - ◆ Mailing and discussion lists, wiki portal
 - ◆ Training reports and tutorials, videos, slides and docs
 - ◆ Access to the AXMEDIS workshops and training
- **The affiliation can be performed via the affiliation agreement**
 - ◆ information can be recovered from the DVD and on the portal
- **The affiliation has a small annual fee that**
 - ◆ can be covered in money or by value, offering contributions to the AXMEDIS Framework for the community.
 - ◆ Is free of charge for no profit institutions







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Contact Information

- ***If you like to know more about the AXMEDIS framework and other AXMEDIS technologies and functionalities please do not hesitate to contact the project coordinator***
- ***Prof. Paolo Nesi, Ph.D.***

*DISIT-DSI, Department of Systems and Informatics
Distributed Systems and Internet Technology Lab
University of Florence
Via S. Marta 3, 50139 Firenze, Italy
Email: nesi@dsi.unifi.it
Web: <http://www.AXMEDIS.org>*







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Click here to download the video of the Tutorial

- **slide 62: editor-new5b.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3643
- **slide 77: mn1.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3644
- **slide 96: play5-N.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3645
- **slide 98: play5-VIDEO-NESI.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3646
- **slide 100: pda-short.mpg**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3647
- **slide 132: part2-sat-client-NESI.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3648
- **slide 139: AXELTEO-TEO-STB-demo.mpg**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3604
- **slide 141: ELION-enduser-nesi.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3649
- **slide 143: bbc-user3.mpg**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3650
- **slide 152: siae-presentation-short-July2007-new-nov07.wmv**
 - ◆ http://www.axmedis.org/documenti/view_documenti.php?doc_id=3651


www.AXMEDIS.org, Paolo Nesi, November 2007

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